A PHONOLOGICAL COMPARATIVE STUDY OF THE JEN LANGUAGE CLUSTER

by

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THIS RESEARCH PROJECT HAS BEEN READ AND APPROVED AS MEETING THE REQUIREMENTS OF THE THEOLOGICAL COLLEGE OF NORTHERN NIGERIA, BUKURU/UNIVERSITY OF JOS.

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EXTERNAL EXAMINER

DEDICATION

This thesis is dedicated to God Almighty, who made all things possible in his time.

It is also dedicated in loving memory of my late grandparents, Othaniel Yapi Basore, Martins Markus Nduna, Maryamu Sarkin Noma, my late aunt Ama Doris Amos and my late brother Johnwesley Kefas Othaniel. You all loved education with great exuberance.

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ABSTRACT

The *Ethnologue* classifies the following ten languages under a group called Jen: Burak [bys], Dza (Jenjo) [jen], Kyak (Bambuka) [bka], Lelau [ldk], Loo [ldo], Maghdi [gmd], Mak (Panyam, Zo) [pbl], Moo (Gomu) [gwg], Munga Doso [mko], and Tha (Joole Manga) [thy]. This study determines how they relate phonologically. The research sought for regular sound correspondences from a table of cognates drawn from a wordlist of three hundred (300) words collected from each language. The result shows significant phonological relationship between these languages in terms of sound inventory and sound correspondence. Furthermore, the research suggests ways that the Jenjo orthography can be modified in order to suit the other languages of the cluster.

1 INTRODUCTION

One of the commendable achievements in the world of linguistics is the classification of the world's languages into families. Prominent among the earlier linguists whose work contributed immensely in classifying languages into several phyla is Joseph Greenberg. He had series of publications in which he suggested grouping of languages. The grouping was done based on some perceived or proved distinctiveness of the languages. To a layman, it is indeed a fascinating thing to have a number of languages with geographical proximity and close social interaction yet not genetically related and vice versa. Nevertheless, it is common to find clusters of languages with geographical proximity and at the same time genetically related. This is the case with ten (10) languages from one of the least studied branches of the Niger-Congo language phylum known as the Adamawa languages.

The languages are; Burak, Dza (Jenjo), Kyak (Bambuka), Lelau, Loo, Maghdi, Mak (Panyam, Zo), Moo (Gomu), Munga Doso, and Tha (Joole Manga). These were classified by *Ethnologue* under one family named "Jen". The speakers of the languages are predominantly found in Taraba State, North-East Nigeria, with the exception of Burak which is the only language whose speakers are predominantly found in Gombe State. The languages are settled so closely that there is no other language group found in their midst. Apart from the geographical proximity, speakers of these languages often claim relationship between their languages. This hypothetical claim however, was affirmed to be true by the likes of Ulrich Kleinewillinghöfer, Roger Blench, *Ethnologue, Glottolog* etc. Their works proposed the languages are genetically related thereby grouping them together or internally subdividing the languages but still linked. This study observed further the phonological relationship between these languages and tested how

prior phonological study of one of the languages i.e Jenjo could help in proposing orthographies for the languages of the cluster.

1.1. STATEMENT OF PROBLEM

This is a comparative linguistic study which seeks to investigate the phonological relationship between ten languages labeled as Jen by *Ethnologue*, or Bikwin-Jen by Kleinewillinghöfer (Bikwin-Jen Comparative Wordlist). The investigation shall involve comparison of wordlists collected from each of the ten languages. The research seeks to use the phoneme inventory of the Jenjo language and compare with in the other languages of the Jen cluster using sound correspondence sets.

1.2. THESIS QUESTIONS

The researcher formulated the following research questions to serve as guide to relevant research and data collection:

- How are words of basic vocabulary pronounced in the languages of the Jen cluster?
- What word cognates are there between the words of basic vocabulary of the Jen language cluster?
- What sound correspondences are there between words of the Jen language cluster?
- What adjustments, if any, can be made to the Jenjo writing system that could help in proposing writing systems for the other languages of the Jen cluster?

1.3. PURPOSE OF STUDY

This research was sparked by an interest in linguistic comparison. When language development work started in Jenjo in 2008, some Munga people became curious about what was happening and wanted to benefit from it. Two years later, the researcher joined the Jenjo language development project in May 2010 as a literacy officer. Right from that time, invitations were received from the Munga area that there was need for a literacy

class to be organized there. This is because the speakers have perceptions that their language is closely related to Jenjo and that what works for Jenjo will likely work for Munga. But as a speaker of Jenjo, the researcher could hear some linguistic variations here and there in the speech of Munga speakers. This perceived variation lead the researcher to visit Munga Doso in March 2012. The purpose of the visit was to collect words in the Munga language to compare with lexically similar words in Jenjo.

Coincidentally, the researcher had to stop at the Lelau area to refill fuel before taking the road to Munga Doso. Then something happened that amazed him more. He could pick out some words in the speech of the Lelau speakers, which sounded similar to Jenjo words but with some phonetic differences. For example, the casual way of saying goodbye in Jenjo is [sé nàlə̀], the researcher heard something similar said by Lelau speakers, [sè náθə̀]. In the example, the only difference between the Jenjo and the Lelau phrase for goodbye is, the Jenjo use the lateral approximant [l] where the Lelau use the voiceless interdental fricative [θ]. This serendipitous event sparked the interest of the researcher to compare more than just Jenjo and Munga Doso. Out of curiosity, the researcher attempted to collect a list of nouns from students of the Government Day Secondary School Jen who are speakers of the above ten languages. But the exploration could not go further because the researcher has a limited knowledge of linguistics at that time.

This research is a dream come true, an opportunity to compare these languages by seeking for linguistic similarities and dissimilarities. The research seeks to be a groundbreaking study that will make way for further studies in these little studied languages. It shall help other linguists and the upcoming indigenous linguists from these language groups, who are interested in doing similar research or other linguistic research that relates to this one. The study shall also explore ways that prior linguistics studies in

one daughter language of a cluster can be beneficial to the other daughter languages of the cluster. In this case, the research will seek for ways the Jenjo orthography can be modified in order to suit well for the other languages of the cluster. The findings of this research shall be a bridging tool for the state and local government authorities, non-governmental organizations, especially language developers within and outside these communities. It will aid them in terms of proper planning for language development work in these languages whenever the need arises.

1.4. METHODOLOGY

The researcher carried out library research to investigate the sub-classification of these languages under the Adamawa sub-group, and under one unit called "Jen". He shall further investigate some distinctive features of the Adamawa languages.

The researcher designed a wordlist of 300 words of basic vocabulary to collect from each of the ten languages. The linguistic fieldwork was carried out in the native settlement areas of these languages. The wordlist consisted of nouns, verbs, counting numbers and other parts of speech that are common to all the ten languages. The wordlist was tested with the Jenjo language to be sure that the items in the wordlist are not strange to the cluster. However, Jenjo is not here considered superior of the other languages, but it is chosen as a reference because it already has a tentative orthography and because the researcher is a mother-tongue speaker of the language and has carried out previous studies in the language where he collected over two thousand words and has done a phonology write-up.

The data collected from all the languages using the wordlist was compiled in a comparative table for the analysis. From this table, the sets of cognates were selected and sound correspondence sets drawn out into tables. It is from these sound correspondence tables that some of the phonological similarities and dissimilarities of these languages surfaced. The analysis shows the corresponding sounds that Jenjo shares with the other

languages, and the sounds that are not found in the Jenjo language. This gives the picture of the graphemes each language needs to supplement or decrease from the Jenjo orthography in order to suit it well.

1.5. SCOPE AND LIMITATIONS

This comparative study seeks to explore the phonological relationship between the languages of the Jen cluster. It will not discuss the history, culture or other anthropological features of the people. The study is narrowed to phonology among other "several aspects of language. ...such as phonetics, morphology, syntax, and discourse". (Burquest 1).

The phonological patterns of languages are known to be organized hierarchically (Burquest 11). Considering the hierarchical organization of the phonological patterns of languages, this study aims a phonological comparison at the segment level. Furthermore, this research is not aimed at detailed phonemic analyses of all the languages of the Jen language cluster. Rather, it shall be a direct comparison of sound inventories of the languages of the cluster, and the correspondence sets that follows. As earlier stated, the researcher has done phonological analysis and a phonology statement of the Jenjo language in May 2016. The phonemes of Jenjo are known to him, and that shall be the basis for the comparison of other sounds found in the other languages of the cluster.

The orthography recommendations for the other languages of the Jen cluster shall be based on the linguistic findings of the research. The suggestions shall be symbols for prospective phonemes of the languages.

1.6. DEFINITION OF TERMS

The following terms are relevant and hereby defined for the purpose of clarity to readers. They are as follows; phonology, segment, phoneme, comparative study, language cluster, correspondence, cognates, orthography, and grapheme.

1.6.1. Phonology

Phonology is "a branch of linguistics which studies the sound systems of languages." (Crystal 365)

1.6.2. Segment

Crystal defined a segment as "any discrete unit that can be identified, either physically or auditorily, in the stream of speech." (426).

1.6.3. Phoneme

A phoneme is the smallest contrastive unit of sound that distinguishes meaning in a particular language.

1.6.4. Comparative Study

The term comparative study here refers to "the standard comparative philological technique of comparing a set of forms taken from cognate languages in order to determine whether a historical relationship connects them." (Crystal 90).

1.6.5. Language Cluster

A Language Cluster consists of a group of languages defined by some shared similarities.

1.6.6. Correspondence

This refers to "any similarity of form between words or structures in related languages." (Crystal 118).

1.6.7. Cognate

The term cognate refers to "a linguistic form which is historically derived from the same source as another form." (Crystal 83).

1.6.8. Orthography

Orthography or a writing system refers to the conventional way a particular language is written.

1.6.9. Grapheme

A grapheme is "the minimal contrastive unit in the writing system of a language" (Crystal 220).

2 LITERATURE REVIEW

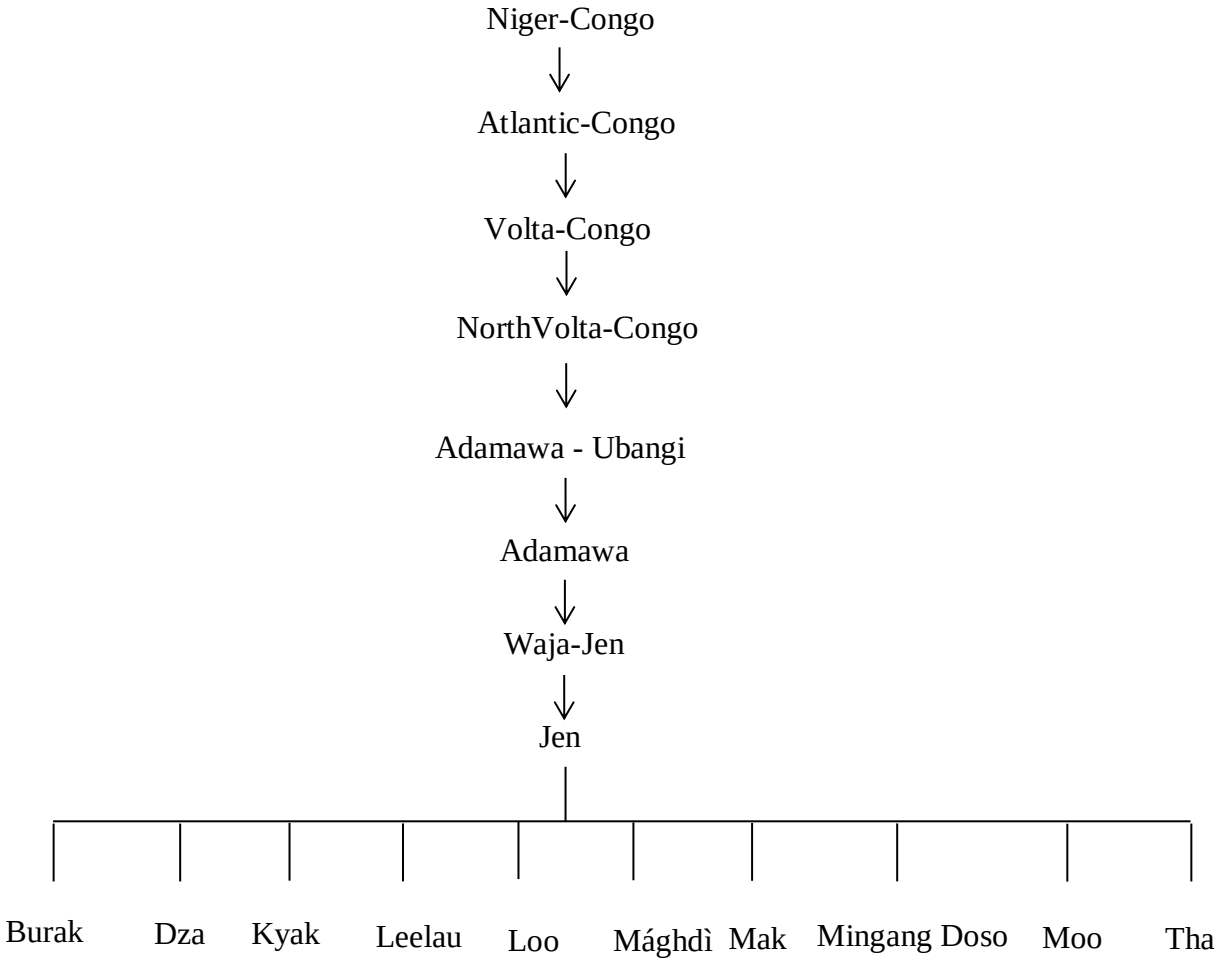
This piece of research, the comparative study of the Jen language cluster, seeks to explore the phonological affinity between ten languages known as the Jen cluster. In particular, the researcher's attention is on sound correspondences using a comparative wordlist. The aim is to check for possible adjustment that can be done to an already existing orthography of one of the languages in order to recommend a suitable writing system for the other members of the cluster. In this chapter, the researcher will explore linguistic literature that relates to this study.

2.1. CLASSIFICATION OF THE LANGUAGES

This research mainly focused on the classification by *Ethnologue*. But there are conflicting views on the sub-classification of these languages whether they belong to the Adamawa-Ubangi or to the Gur family. *Ethnologue* has the languages of Jen cluster under the Adamawa group, while *Glottolog* sub-classified the languages under the Gur family. This section will consider some trends on how these languages were considered a unit and sub-classified under the Adamawa in *Ethnologue* and Gur in *Glottolog*.

2.1.1. Classification by *Ethnologue*

Ethnologue classified the languages of the Jen cluster as follows:



As can be seen above, Ethnologue classified the languages as one group known as "Jen." The Jen group was classified as Adamawa under a subgroup known as the Adamawa – Ubangi. Blench (Adamawa-Ubangian Languages) identified this group as a major branch of the Niger-Congo family with about 160 languages.

2.1.2. The Sub-classification of the Languages as Adamawa

The Niger-Congo branch known as Adamawa is said to be started by by Joseph Greenberg as reflected in his work (*The Languages of Africa*). According to Boyd, "Using the method he called 'mass comparison', Greenberg… set up an 'Adamawa – Eastern' branch of Niger – Congo to contain a large number of Central African languages

and language groups previously treated as individual units or 'clusters'" (170). However, since then the name of the group has changed from Adamawa-Eastern. Dimmendaal pointed out that, "Samarin… renamed this branch Adamawa – Ubangi." (89).

In his new group "Adamawa – Eastern", Greenberg mentioned two languages of the Jen cluster, "Jen, Munga" as a unit under the Adamawa languages (9). The name Munga may either refer to Lelau or Munga Doso, but it is clear from Greenberg's items of Adamawa-Eastern comparative wordlist; the name refers to the Munga Doso. Moreover, it was observed that the "Jen, Munga" wordlist items by Greenberg (13 – 24) are identical to Meek's wordlists of Jenjo and Munga Doso *(Tribal Studies in Northern Nigeria Vol. 2, 530 -538)*. This leaves out eight of the Jen languages in *Ethnologue*. The reason may be due to scarcity of data at that time.

As pointed out, only two languages; Jen/Munga are mentioned by Greenberg (13 – 24), leaving out eight more which made up the Jen cluster in Ethnologue. Sometime later, Boyd mentioned of a new group called Burak, which consists of Burak, Lo, Panyam (Mak), Bambuka (Kyak), Gwomu (Moo) and Lelau (*Adamawa Ubangi*, 189 – 190). Though, this group was first mentioned in Hansford, Bendor-Samuel and Standford (181 – 182). Boyd pointed out that, "Jungraithmayr (1968/69) seems to have been the first to provide published information on Burak. His short word list suggests affinities with Jen/Munga…, who are geographically close neighbors." (189). But again the above list leaves out two more languages, Maghdi and Tha. It was later in Crozier and Blench that all the languages of the *Ethnologue* Jen cluster appeared as Adamawa languages but in two different groups, Bikwin and Jen (123).

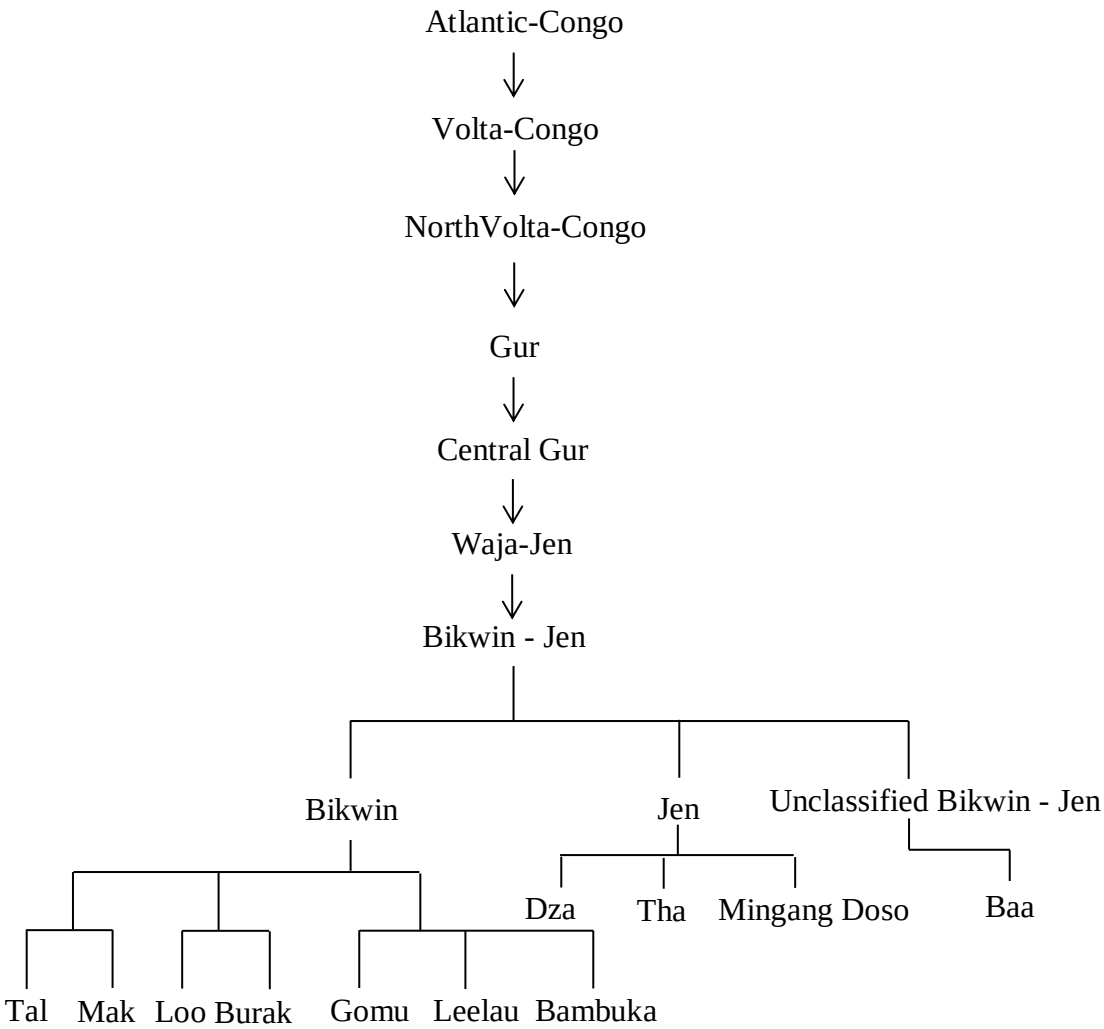
Crozier and Blench has the Bikwin group to include; Burak, Loo, Mak, Tala, Kyak, Moo, Lelau and Maghdi. Some groups came in between and then the Jen group was mentioned which include; Dza, Mingang Doso and Jaule (123). Bikwin is a phrase

adopted by the speakers of these languages which means ‘we are one’ as the motto of their association. Under the Bikwin group, there was an uncertain language called Tala with a question mark (Cozier and Blench 123). However, Tala does not refer to a particular language, it is simply a generic name which means “mountain dwellers” and that include more than one language. Maghdi happens to be one of the languages that answer the name Tala. And under the Jen group, the Jaule has a question mark. Jaule or Joole is an alternative name of Tha. Though, the speakers of the language never called themselves Jaule, but as Tha (ðà). The name Jaule refers to two groups; the Jaule Nyawo and the Jaule Manga. In (Blench 94), both groups were represented independently as Tha and Joole. This is discussed further in chapter three of this thesis.

Kleinewillinghöfer is likely to be the first to bring these languages together under a group Bikwin – Jen (Bikwin-Jen Comparative Wordlist). Though, when Bennett raised issues with Greenberg’s “Adamawa – Eastern” languages, he mentioned of a group called “Burak – Jen” which he classified under a group called the “Trans-Benue”. But the languages that made up this group were not defined by Bennett. It was in *Ethnologue* that all these languages were brought together under one group, “Jen”. The name ‘Jen Cluster’ is picked from this classification.

2.1.3. Classification by *Glottolog*

As earlier pointed out, the affiliation of the Jen cluster languages has variations. Some sources affiliated the languages to the Gur family. This is reflected in the classification by *Glottolog* as follows:



As can be seen above, the languages are classified as members of the Gur branch belonging to the Central Gur subgroup. In this classification, the languages of the Jen cluster were separated from other neighboring languages such as Mumuye, Yendang etc who were all part of the Adamawa group in *Ethnologue*. This classification closely relates to the work of Bennett ("Adamawa-Eastern: Problems and Prospects") as reported by Kleinewillinghöfer (*Relationship between Adamawa and Gur Languages, 26*).

2.1.4. The Sub-Classification of the Languages as Gur

The classification of the Jen cluster of languages to the Gur family is linked to Bennett as pointed out above. Bennett raised an issue that, "The languages classified by Greenberg as Adamawa-Eastern are probably the most poorly documented of all the major divisions of Niger-Congo." (23). Thus he asked the question, "…are the languages

properly assigned to this rather than to other branches of Niger-Congo?" (23). As such, he advocated "linguistic reconstruction and subgrouping by innovation" against the former classification "on a basis of typology and Greenbergian 'mass-comparison' (23). Bennett picked the Tula-Longuda group, which according to him, "are among the better documented of the westernmost divisions Adamawa – Eastern, and are typologically close to Gur."(35). He identified two groups which pattern with the Tula-Longuda from his lexicostatistical studies. These two groups are; Yungur cluster and Burak-Jen. These groups together with Tula-Longuda he considered to form a unit which he named the "Trans-Benue" (41). Finally in his studies, Bennett suggested that there is no clear boundary between Greenberg's Adamawa-Eastern and Gur. He pointed out, "It is possible that we may find simply that some branches assigned to Gur are in fact Adamawa-Eastern…. It is also not impossible that new data may indicate unity for most of the Adamawa-Eastern, but force the reassignment of the Trans-Benue languages to Gur." (Bennett 44). However, he may not be the first to notice this issue. Other linguists such as Jungraithmayr "…pointed towards closer links between Gur and Adamawa within the Niger-Congo phylum" (Dimmendaal 89).

The argument behind the assignment of the so called 'Trans-Benue' to Gur has some questions too. Kleinewillinghöfer considered that it is difficult to conclude that the so called "Trans-Benue" languages are more closely related to the Gur languages than they are to the other Adamawa-Ubangian languages (*The relationship between Adamawa and Gur Languages: A Case Study of Waja and Tula*). For example, when Kleinewillinghöfer observed the similarity in the vowel systems of the "Trans-Benue" and the Gur languages, he opined that, "*the similarity* can only be regarded as a common retention and is of no further significance for the question of a closer North Western Adamawa-Gur relationship as opposed to a closer North Western Adamawa-Adamawa-

Ubangi relationship." (28). Kleinewillinghöfer also pointed to some phonological gaps between Bennett's "Tula-Longuda" group and other North Western Adamawa languages. He observed that implosive stops /ɓ/ and /ɗ/ do not occur in Tula and Waja, but are generally found in the Bikwin-Jen group. The velar-labial stops /k͡p/ and /g͡b/ are not attested in Waja and Tula, but these are in fact found in some of the Bikwin-Jen languages (27-28). This suggests that, even if Waja and Tula seem to closely relate with Gur, other language groups of the 'Trans-Benue' may not necessary possess the same affinities with Gur.

2.1.5. The Unity of the Jen Cluster

So far, the languages are said to be related to both Gur and the Adamawa languages somewhere in the middle. As we have seen above, *Ethnologue* placed all the ten languages under one group i.e Jen, while *Glottolog* grouped them under a name, "Bikwin-Jen" with an additional language "Baa" otherwise known as Kwa. This suggests that none of the two sources opposed the unity of Jen cluster. Bringing the languages under one unit suggests that the languages are genetically related.

2.2. THE PHONOLOGICAL FEATURES OF ADAMAWA LANGUAGES

The Adamawa languages as a family have some distinctive phonological features which its members share as a result of retention from an ancestor language of the family. A specific area of interest for this research would have been a description of the sound inventory of the proto-Adamawa language. But as seen above, the unity of the group itself is too disputed to talk more of the reconstruction of the phonological features of a proto-Adamawa language. Blench rightly described the Adamawa-Ubangian languages as, "important but little-known languages" (*Adamawa-Ubangian Languages).* But in this section, we shall observe the general overview of Adamawa languages given by Boyd (199 – 202). A particular area of interest for this research is the consonant and

vowel systems of the Adamawa languages. Let us briefly compare his submissions with Jenjo, one of the daughter languages of the Jen cluster. Below are some checks of his submissions with the phonological statements of Jenjo based on Othaniel (Phonology Write-up).

2.2.1. The Consonants System

Boyd pointed out that, "In Adamawa languages, the set of intervocalic/final consonants is generally much smaller than the inventory of initial consonant phonemes" (199). This feature is true of the Jenjo language. In fact, /ŋ/ is the only legitimate final consonant in Jenjo. Although, Jenjo has about thirty three (33) initial consonant phonemes and twenty two (22) intervocalic consonants as it can be seen in Othaniel (Phonology Write-up). Furthermore, Boyd says that, "The voiced/voiceless contrast is apparently universally employed for stops and fricatives…, but the contrast may be neutralized in the labial order." (200). Consider the Jenjo phoneme chart in table 1 below from Othaniel (Phonology Write-up);

Table 1

	bilabial	**labio dental**	**alveolar**	**post alveolar**	**palatal**	**labio-velar**	**velar**	**glottal**
Implosive	(ɓ)		(ɗ)					
Plosive	p b		t d		c ɟ	k͡p g͡b	k g	
Affricate			t͡s d͡z	t͡ʃ d͡ʒ				
Nasal	m		n		ɲ		ŋ	
Fricative		f v	s z	ʃ ʒ				h
Approximant			l		j̥ j	ʍ w		
					ɥ̥ ɥ			

The voiced/voiceless contrast is apparently evident in stops and fricatives in Jenjo as asserted by Boyd. He also stated that, "Preglottalized (implosive) stops are frequently found, particularly **ɓ, ɗ**…" This is true of the languages of the Jen cluster

specifically in the case of [ɓ] and [ɗ]. Although, in Jenjo all the environments where [ɓ] appears, [b] can replace it, but there are words that are strictly [b], [ɓ] cannot replace it. This kind of partial free-variation also occurs between [ɗ] and [d]. In all the environment [ɗ] appears, [d] can replace it, but there are words that are strictly [d], [ɗ] cannot replace it. For example,

a. [ɓút͡ʃí] ~ [bút͡ʃí] "arrow"

b. *[ɓɨ̀] ~ [bɨ̀] "tsetse fly"

c. [ɗɨ̀] ~ [dɨ̀] "take"

d. *[ɗùɗú] ~ [dùdú] "tickle"

But in other languages of the cluster, the bilabial and the alveolar implosives are rampant.

In the case of nasals, Boyd pointed out that, "Simple nasal series rarely contain more than three members. If there are four (**m, n, ɲ, ŋ**), one of the back nasals may be rare in the lexicon." (201). The Jenjo data shows that /ŋ/ has a very high frequency of occurrence more than all the other nasals. But actually very few lexical items have /ŋ/ syllable-initially. Most of the occurrences are in the final position. And Boyd noted that, "While labiovelar orders with strong labial occlusion are common, they usually contain **ngb, kp, gb** at the most." (201). A look at the Jenjo phoneme chart in table 1 above, one can see / k͡p/ and /g͡b/ featured.

2.2.2. The Vowel System

Concerning vowels, Boyd discussed the possibility of Adamawa languages whose vowel system "may be a square (nine vowel) system" (202). This perfectly describes the vowel system of the Jenjo language. Consider the vowel phoneme chart from Othaniel (Phonology Write-up) in table 2 below:

Table 2

	Front	*Central*	*Back*
Close	i	ɨ	u
	e		o
Mid		ə	
	ɛ		ɔ
Open		ɑ	

Boyd pointed out some distinctive features of vowels of the Adamawa languages to include "vowel length" and "nasality" (202). The Jenjo vowels however do not show the lengthening feature. But all the Jenjo vowels with the exception of the close-mid vowels [e] and [o] can occur nasalized. Furthermore, Othaniel pointed out an additional feature of breathiness (Phonology Write-up).

So far, looking at the Jenjo phonological statement from Othaniel, we can see that Jenjo exhibits some of the phonological features of the Adamawa languages. On the other hand, it is possible that data from other languages of the Jen cluster will show stronger or lesser resemblance with Boyd (199 – 202). After all, the direction of change and the percentage of retention among the languages of Jen cluster are not yet established. But one would expect that the consonant and vowel systems of the Jen cluster will look similar to the Jenjo phoneme list above. Slight differences should not be a surprise, since the languages have developed individually.

2.3. THE COMPARATIVE METHOD IN LINGUISTICS

The comparative method has a long history in linguistics. It has been widely applied in research for the purpose of either language classification or reconstruction of a proto-language from genetically related languages. Specifically in regards to comparative study of African languages, Dimmendaal noted that "…the German missionary Sigismund Wilhelm Koelle is probably to be credited for being one of the founders of this

academic discipline through the publication of his *polyglotta Africana…*"(5). After him there were others who followed suit. Noticeable in this research is Joseph Greenberg. According to Blench, "In the 1950's, GREENBERG made explicit the method of 'mass comparison', the piling up of sound-meaning correspondence" (*New Developments in the Classificaiion of Bantu Languages and their Historical Implications, 152)*. It was by applying the comparative method that Greenberg was able to find a place for languages like the "Adamawa-Eastern" group, which according to Blench (Adamawa-Ubangian Languages) were, "previously treated as 'isolated languages'".

As important as the method appeared to be for classifying genetically related languages and the reconstruction of proto-languages, its weaknesses were bare in the eyes of some people. For example, Schadeberg mentioned four complications that had to be resolved in terms of identifying cognates when applying the comparative method (85-86). These include: when no word is known from a certain language for a certain meaning; obvious loanwords; uncertainty of where to place items which may or may not be cognates with other items; and when two items or one compound item had been recorded with (approximately) the same meaning. In addition to these complications, some reasons why words of languages may be similar as mentioned by Dimmendaal include the factor of chance, and sound symbolism (7).

For this piece of research, the above concerns were taken into consideration in the design of the wordlist and the selection of cognates. Secondly, this research aims at finding out the similarity in basic vocabulary of the Jen cluster. It is not done with the interest of reconstructing a proto-Jen ancestor but to propose workable writing system for each of the languages of the cluster according to how they differ from the Jenjo language.

3 METHODOLOGY

This research work started on the surface as a comparison of semantically similar words of the Jen language cluster. But as the researcher explored further, it became inevitable to adopt a more advanced and scientific method as used in the field of comparative linguistics. The instrument used for the data collection was basically an adapted wordlist. The instrument however received some panel-beating before arriving at its' finished form. Furthermore, the researcher carried out linguistic fieldwork in all the ten languages to collect the data for this piece of research. This chapter shall discuss the steps followed in arriving the finished form of the instrument, the process of data collection and the methodology for the analysis of the data.

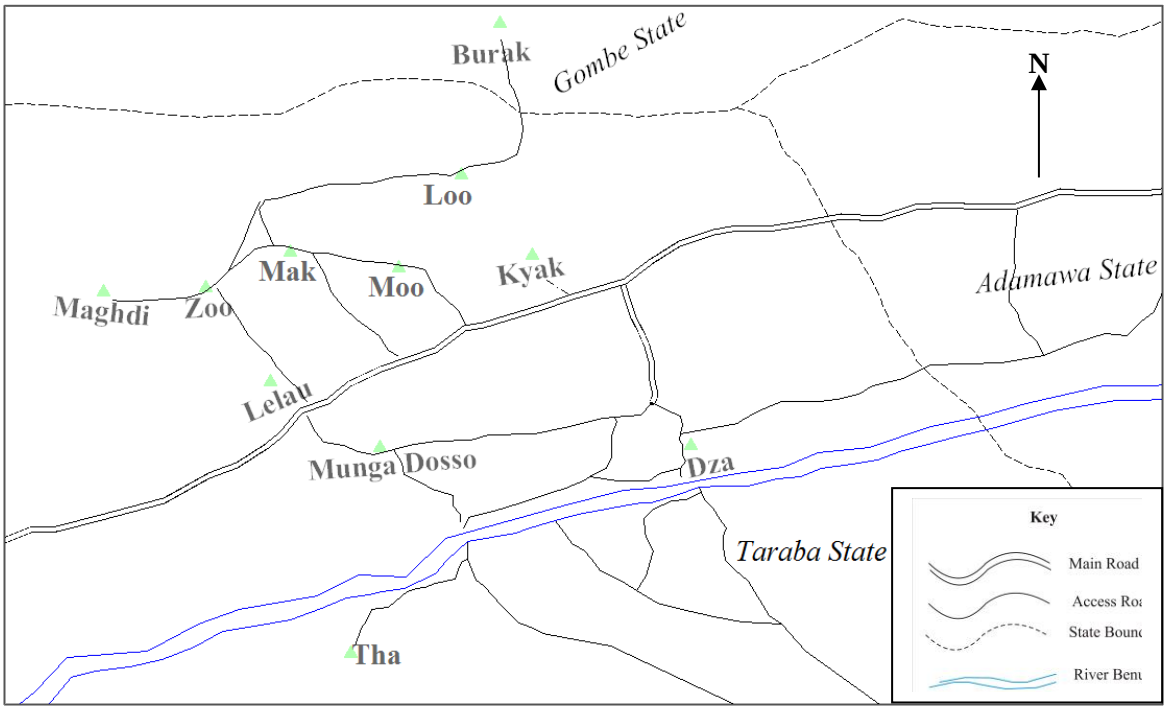
3.1. INSTRUMENT FOR DATA COLLECTION

The instrument used in collecting the data for this piece of research is a wordlist. The wordlist was adapted from Schadeberg by Norton and Alaki. The wordlist used for the data collection in this research is an adjusted version of the Norton and Alaki wordlist. The researcher modified the wordlist by domesticating the items with words that are common to the target communities where necessary. Most words that were removed are either unknown to the target community or may result to long phrases. In earlier consultation with the research supervisor, it was agreed that words that will not provide new roots should be avoided. Therefore, the researcher refined the wordlist in order to target root words and words native to the target communities. For example, the word 'tree branch' and the color 'green' are descriptive phrases without any new roots in Jenjo. Tree branch in Jenjo is "Kəna kə" literally 'hand of tree' while the color green is "kə a mɨnghu" literally the 'color of grass'. On the other hand, initially there were no pronouns in the wordlist, but these were added, because it will be difficult for these to end up as descriptive phrases.

The wordlist is basically an alphabetically arranged list of nouns, verbs, adjectives, numerals and pronouns. There are three hundred items on the wordlist. Initially the researcher proposed to collect just two hundred words, but this was later reviewed to 300 words. This was done to create room for new roots and reduce the effects of redundant roots in the wordlist. After making the wordlist, the researcher first collected the words in the Jenjo language to test it. This was then approved for the data collection.

3.2. DATA COLLECTION PROCEDURE

The researcher did linguistic fieldwork in the native settlements of all the target languages. Prior to the time of this particular linguistic fieldwork, he has already collected more than two thousand (2000) words in the Dza (Jenjo) language. As a mother tongue speaker, it was not difficult to collect three hundred words. Yet in order to ensure accuracy, the researcher sought the help of other speakers of the Jenjo language. For the other nine languages, the researcher visited the settlement area of each language. These are shown in the map below:



The map of the Jen Language Cluster

3.3. BRIDGING LANGUAGE

The wordlist was prepared in the English language, but it became necessary for the researcher to figure out a suitable bridging language wherever necessary for respondents with low or no proficiency in English. In eight of the language communities, the researcher used Hausa as the bridging language. But in the case where majority of the respondents at that time are educated, the researcher used English. Insisting on using Hausa may be misconceived to be a disregard or even scorn of their academic status or English proficiency. In order to check for the accuracy of the data being provided, the researcher from time to time asked for the Hausa gloss of the words given.

While in Munga Doso and Tha language communities, the researcher mostly used Jenjo as the bridging language. The speakers of Munga Doso preferred the items to be called in Jenjo instead of Hausa, since Jenjo is more comprehensible than Hausa. The researcher observed that the data collection process became faster after switching the bridging language from Hausa to Jenjo. After the Munga Doso, Tha (Joole Manga) was the next language community. They are the only language group in the cluster that is resident in the Southern bank of the Benue. The researcher first called out the wordlist in Hausa, but when there is hesitation switching to Jenjo is often the remedy. The Jenjo language proficiency of the Tha people is not as high as that of the Munga Doso. So, the researcher kept switching back and forth in Hausa and Jenjo whenever necessary.

3.4. MEDIUM FOR THE COLLECTION OF DATA

Some of these languages are located in remote areas. Therefore, the wordlist was printed out and transcription made on paper. This is to avoid possible challenges that lack of electricity or other electronic fault may cause if the researcher were to insist on straight transcription into the computer. Data from Jenjo, Lelau, Munga Doso and Tha were all

typed straight into the computer, while Kyak, Moo, Mak, Loo, Burak and Maghdi were recorded on paper.

3.5. CHOICE OF DIALECTS

There were three languages where the researcher had to made decision of which dialect to collect data for this research. The first was between the Panya and the Zo dialects of Mak. The researcher was at first skeptical about these two being different languages. Hence, the 300 word list was collected from both dialects, but it turned out to really be unnecessary due to the affinities showed by the data. Zo speakers explained that they originated from Panya. Both communities refer to themselves as the "Mak" people. Hence, the researcher opted to use the Panya data for the comparative analysis in chapter four. The second was between the Tadam and Shoŋɔ dialects of the Loo language. According to the Loo speakers, there are about eight (8) clans as follows; Vo, Gur, Ɓɛɛnɛ, Fɔrɛ, Tamo, Lodɔp, Ɓənə and Ləu. Two of these clans, Vo and Gur speak the Tadam dialect, while the other six speak Shoŋɔ dialect. Though, the people generally refer to themselves as the "Shoŋɔ" people. The first contacts of the researcher were the Tadam speakers at Loo Bamdi, but they instead recommended that the researcher should go to Loo Dara (Shoŋɔ dialect) to collect the data. Therefore, the researcher went on to Loo Dara where the majority dialect "Shoŋɔ" is spoken.

The third language is the Tha (ðə) language. Historically, the Tha people were speakers of the Jenjo language. But they were later banished according to oral tradition due to their seclusion from a communal worship gathering. Initially they were across the Benue not far from Jen. Some of them later moved South-West of Jen to around Lau area (today known as Joole Manga), while the others remained closer to Jen (known as Joole Nyawo). The Joole Nyawo still speak a dialect of the Jenjo language. When the researcher collected a few words from the Joole Nyawo, everything appeared similar with

the Dza data with a few changes in tone on some lexical items. But the Joole Manga now speak a tongue which varied significantly with the Jenjo language. Therefore, the researcher opted to collect the data from Joole Manga.

3.6. LANGUAGE CONSULTANTS

For every language community, the researcher started by visiting the paramount chief or traditional ruler of the language speakers. After a brief introduction, the researcher lay bare the purpose of his visit and how the community can benefit from it. This was done in order to avert any wrong perception of whether the data is going to be used for political purposes or in other ways against the community. Acceptance was easy because almost all the language communities are beginning to be afraid of how their language is threatened by Hausa and English. Another added factor is the fact that the researcher is someone from the neighboring and related Jenjo community.

In some language communities visited, after seeking permission to commence data collection, the researcher was directed to some special people, probably recognized and respected as "the language custodians". But the problem often encountered with this kind of recommendation was that most of these "language custodians" are advanced in age and may have defects in their speech organs. Since there are not many of this type of people in a single community, the researcher often suggests that many people of different age and gender should contribute in giving the data. It will be disrespectful to point out such defects in people whether obvious or not. The categories of such people are helpful in terms of fishing out borrowed words and correcting pronunciations. They help in reviving words of the language that have become moribund over time.

On the other hand, there are communities where permission is granted to the researcher with liberty of choosing respondents. In these language communities, the preferred choice of the researcher is young adults and middle age group of 35 – 45 years.

The researcher walks around in the community to meet such people naturally under a tree or local business area. Sometimes, the data collection commences with three to four people, but gradually the number increases. Some people take it as fun to be able to call out words. While in other cases, some people may resist to participate. In the case of resistance, the researcher moves on to find other people instead of insisting.

The language consultants are mixed in terms of occupation and gender. Some are farmers, others are students, others are retired clergy, and some others are civil servants. In about three language communities, the traditional rulers participated in providing data. These were Loo, Maghdi and Lelau.

3.7. DATA SORTING

The items on the wordlist as prepared in English were sorted in alphabetical order. After collecting the data, the researcher keyboarded them into Microsoft Word in an eleven columned table. The first row was a header, with the name of the languages boldly written. The data for each language was entered appropriately under its column. The English gloss for the words are always in the first column of every row.

3.8. CARRYING OUT THE COMPARISON

The phonological comparison carried out in this research was based on the prescriptions of Dimmendaal on explaining similarities. First, an inventory of all the sound segments found in the data of each language is taken. This was done in a comparison table. The exercise helped to ensure fidelity in accounting for prospective differences in the inventory of consonants and vowels of the languages. Then cognate root words were identified and compared in a table. These are easier to pick out because they are similar in form and meaning. Then the researcher went on to look for recurrent sound correspondences in the data. These were also identified and displayed in a sound correspondence table. In order to draw out the recurrent sound correspondence sets, the

researcher found it convenient to sort the data in the Jenjo column in alphabetical order. The final step was to collect an inventory of mutually exclusive sounds in the languages. These are sounds which are missing in the cognates and recurrent sound correspondence table.

Having done the above comparison and the outcome recorded accordingly, the next step was to draw out a table of the sound inventory from the data, how it is represented in the Jenjo orthography and the suggestion of the researcher of how each of the other languages of the cluster should represent it. For the sounds found in more than one language but not found in Jenjo, the researcher suggested for these sounds to be represented by the same symbols in the language(s). And lastly for sounds which are exclusive to individual languages, the researcher suggested under-differentiation of such with other related sounds, except in the case where there is a strong contrast that will lead to regular ambiguity.

4 PRESENTATION AND ANALYSIS OF DATA

This chapter is an analysis of the data collected from the different languages of Jen cluster. Due to word count policy of TCNN, the complete data of this research is not attached. But you can access the complete Jen cluster comparative wordlist on: https://www.academia.edu.

4.1. PHONETIC REALIZATION OF SOUNDS

4.1.1. Inventory of Consonant Sounds

A synchronic inventory of the phonetically realized consonant sounds in the data of each language is collated and presented in table 3 below:

Table 3

	Dza	**Munga Doso**	**Tha**	**Kyãk**	**Moo**	**Lelau**	**Mak**	**Maghdi**	**Loo**	**Burak**
ɓ	-	+	+	+	+	+	+	+	+	+
ɗ	-	+	+	+	+	+	+	+	+	+
ƙ	-	-	-	+	+	-	-	-	-	-
b	+	+	+	+	+	+	+	+	+	+
p	+	+	+	+	+	+	+	+	+	+
d	+	+	+	+	+	+	+	+	+	+
t	+	+	+	+	+	+	+	+	+	+
ɟ	-	-	+	-	-	+	-	-	-	-
c	+	+	+	+	+	+	+	+	+	+
g	+	+	+	+	+	+	+	+	+	+
k	+	+	+	+	+	+	+	+	+	+
g͡b	+	+	+	+	-	-	+	+	+	+
k͡p	+	+	-	+	+	+	+	-	+	+
ʔ	-	+	+	-	+	-	+	-	+	-
ð	-	-	+	+	-	+	-	-	-	-
θ	-	-	+	+	-	+	-	-	-	-
v	+	+	+	+	+	+	+	+	+	+
f	+	+	+	+	+	+	+	+	+	+

	Dza	Munga Doso	Tha	Kyãk	Moo	Lelau	Mak	Maghdi	Loo	Burak
z	+	+	+	+	+	+	+	-	-	-
s	+	+	+	+	+	+	+	+	+	-
s̪	-	-	-	-	-	-	+	-	-	-
ʃ	+	-	+	-	-	+	-	+	+	+
ʒ	-	-	+	-	-	-	-	+	+	-
x	-	-	-	-	-	-	+	-	-	-
ɣ	-	-	-	-	-	+	+	+	-	-
t͡s	+	+	-	+	-	-	+	-	-	-
d͡z	+	+	-	+	-	-	-	-	-	-
t͡ʃ	+	+	+	+	+	+	+	-	+	-
d͡ʒ	+	+	+	+	+	+	+	+	+	+
m	+	+	+	+	+	+	+	+	+	+
m̥	+	-	-	-	-	-	-	-	-	-
m̩	-	-	+	-	-	-	-	-	-	-
n	+	+	+	+	+	+	+	+	+	+
n̩	+	+	+	+	-	+	+	-	-	-
ɲ	+	+	+	+	+	+	+	+	+	+
ŋ	+	+	+	+	+	+	+	+	+	+
l	+	+	+	+	+	+	+	+	+	+
l̪	-	-	-	-	-	-	+	-	-	-
ɾ	-	+	+	+	+	+	+	+	+	+
r	-	-	-	+	-	-	+	-	+	-
j	+	+	+	+	+	+	+	+	+	+
j̥	+	+	-	-	-	-	-	-	-	-
ɥ	+	+	+	-	+	+	+	+	-	+
ɥ̥	+	+	+	-	-	-	-	-	-	-
w	+	+	+	+	+	+	+	+	+	+
ʍ	+	-	-	-	-	-	-	-	-	-
h	+	+	+	+	+	+	-	-	-	-

There are forty seven (47) entries in the consonant inventory of the Jen language cluster. Seventeen (17) consonant sounds occurred only in few languages. These

sounds include; [ɻ], [ɻ], [ð], [θ], [ʂ], [ʒ], [x], [ɣ], [t͡s], [d͡z], [m̥], [m̩], [ɻ], [r], [j̥], [ɥ̥] and [ʍ]. Some of these sounds are new sounds in words not found in the other languages of the cluster, while others are due to sound changes. The sounds that occur due to sound changes will likely show up in a correspondence series with other regular sounds. On the other hand, there are words that are just rare sounds even in those languages where they occurred. An example is the voiceless bilabial nasal [m̥] found in Jenjo. This sound is a rare one, it occurs only in the word [m̥mɨ̀] 'five' and compound words associated with it. In Othaniel (Phonology Write-up), it was difficult to find a contrast for this sound. And there is no cognate found in the other languages of the cluster for the root [m̥mɨ].

4.1.2. Inventory of Vowel Sounds

There are twelve (12) oral short vowels in the cluster. The table below shows a synchronic inventory of the phonetically realized vowel sounds in the data of each language:

Table 4

	Dza	***Munga Dosso***	***Tha***	***Kyãk***	***Moo***	***Lelau***	***Mak***	***Maghdi***	***Loo***	***Burak***
i	+	+	+	+	+	+	+	+	+	+
ɪ	-	-	-	-	-	-	+	-	+	+
e	+	+	+	+	+	+	+	+	+	+
ɛ	+	+	+	+	+	+	+	+	+	+
ɨ	+	+	+	+	+	+	+	+	+	+
ə	+	+	+	+	+	+	+	+	+	+
ɑ	+	+	+	+	+	+	+	+	+	+
u	+	+	+	+	+	+	+	+	+	+
ʊ	-	+	-	-	-	-	+	-	+	+
o	+	+	+	+	+	+	+	+	+	+
ɔ	+	-	+	+	+	+	+	+	+	+
ʌ	-	-	-	-	-	-	+	-	-	-

From table 4 above, there are twelve (12) oral vowels. Nine of the vowels [i], [e], [ɛ], [ɨ], [ə], [ɑ], [u], [o] and [ɔ] occur widely in the cluster, while the remaining three vowels [ɪ], [ʊ] and [ʌ] occurred only in few languages. The occurrence of these vowels from the data is also rare even in the languages where they occurred.

In addition to the oral vowels, there are seven nasalized vowels [ĩ], [ɛ̃], [ɨ̃], [ə̃], [ɑ̃], [ũ] and [ɔ̃]. And there are eight breathy vowels [i̤], [e̤], [ɛ̤], [ɨ̤], [ə̤], [ɑ̤], [ṳ] and [o̤]. These are displayed in table 5 and table 6 below:

Table 5: Nasal Vowels

	Dza	**Munga Doso**	**Tha**	**Kyãk**	**Moo**	**Lelau**	**Mak**	**Maghdi**	**Loo**	**Burak**
ĩ	+	+	+	-	-	+	-	-	-	-
ɛ̃	+	+	+	+	+	+	-	-	-	-
ɨ̃	+	+	+	-	-	-	-	-	-	-
ə̃	+	+	-	-	-	-	-	-	-	-
ɑ̃	+	+	+	+	+	+	+	-	-	+
ũ	+	+	+	+	-	+	-	-	-	-
ɔ̃	+	-	-	+	+	-	-	-	-	-

Table 6: Breathy Vowels

	Dza	**Munga Doso**	**Tha**	**Kyãk**	**Moo**	**Lelau**	**Mak**	**Maghdi**	**Loo**	**Burak**
i̤	+	+	+	-	-	-	-	-	-	-
e̤	-	-	-	-	-	-	-	+	+	+
ɛ̤	-	-	-	-	-	-	-	-	+	+
ɨ̤	-	-	-	-	-	+	-	-	+	-
ə̤	-	-	-	-	-	-	+	+	-	-
ɑ̤	+	+	-	-	-	-	+	-	+	-
ṳ	+	-	-	-	-	-	+	+	-	+
o̤	+	-	-	-	-	-	-	+	+	+

In general, the modified vowels as seen in table 5 and table 6 above occurred only in few languages. This shows that it will be difficult to find correspondence series with nasalized or breathy vowels.

4.2. COGNATE SETS IN THE JEN CLUSTER LANGUAGES

Table seven below is a display of 103 cognate sets that were drawn out from the comparison 300 words of basic vocabulary collected across the cluster.

Table 7

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
1.	*answer (v)*	kwə̰	gwə́ŋ	gwə̀	gwəb	gwəb	gwəb	gəb	gàb (ɲwā)	gəb (dɛ̄)	gàb
2.	*arm*	kə́ná	nà	kənà	ná	nă	ná	nă	nà	nə̰	nâ
3.	*arrow*	bútʃĭ	ɓùt͡sə̀	m̩bǔ	ɓut͡ʃĭ	ɓút͡ʃĭ	ɓút͡ʃĭ	núŋtâu	təù	ʔɛ́ɾɓwí	âɾfjɔ́k
4.	*ask*	bí	ɓí	bìm	ɓí	ɓíp	ɓìp (bá)	ɓíp	ɓíp	bép	ɓíp
5.	*back*	t͡swà	t͡swà	jəkǔ	mwəl	mwə̌l	mwəl	mə̌l	ɗɨ́màl	mə́l	məl
6.	*beer*	mí	mìm	mɨ̀ì	mín	mín	mín	mín	mín	mín	mìn
7.	*belly*	ɥá	ɥà	ɥà	wá	wá	wá	fú	fū	fú	fû
8.	*beneath*	pū	bù	bò	pí	pī	pìswà	bí	bī	vō	bī
9.	*black*	bī	ɓî	nàɓì	ɓɨ́lɨ̀m	ɓìl	à ɓìlìm	ɓɨ́lɨ̀m	ɓílīm	ɓíl	ɓílīŋ
10.	*bone*	kùkú	kùkʊə̀	kùkù	kɪ̄p	kūb	kùkùp	kwə́b	kóp	kúp	kúp
11.	*bow*	kántɔ̀	kàntə̃́w	g͡bə̀̃təú	kántɔ̃́	kántɔ̀	kàntəù	kàntəû	kə́ptəù	təù	kə́fjɔ́k
12.	*breast*	mì	mì	mī	mí	mĭ	mí	mí	mì	mí	mî
13.	*bury*	t͡swì	t͡swî	tù	sú	sú	sú	tŭ	tú	tŭ	tú
14.	*calabash*	d͡ʒ̀ì	lì	ləì	dɛ̄	dɛ̃	ɗəì	ɗəī	ɗəí	dɛ̄	dɛ̄

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
15.	*carving axe*	sá	sà	ɟé á θánɨŋ	sa̋	sá	θa̋	sá	ʃà	sà	dùmkɔ́lɔ́
16.	*clean*	kḭ́	ì	ka̋	ĭŋ	í	ìθə́	în	dĭ (nɨ̀)	dĭ	dĭ
17.	*cold*	ta̋	ta̋	tḭ́	tém	tém	témθə́	təmá	təmā	təmə̀	təmá
18.	*cook*	ɥì	ɥì	jəù	jō	jŏ	jò	jəû	jəùwē (nūŋ)	jō	jŏ
19.	*crocodile*	ʃɨ́	sɨ̀	sɨ̀	swə́m	sɨ̀p	θɨ̀p	ʂɨ́b	ʃɨ́p	ʃɨ́p	ʃɨ́p
20.	*dance*	dəŋ	dəŋ	də́ŋ	dâŋ	dāŋ	dəŋ	dəŋ	dâŋ	d͡ʒí (nūŋ)	d͡ʒí(nūŋ)
21.	*die*	bwí	ɓwîŋ	ɓwí	ɓwì	ɓwì	ɓwì	ɓērá	ɓílà	ɓúɾɛ̄	ɓwɛ́(ɾɛ̀)
22.	*dig*	hà	hà	ðà	zà	zà	ðà	já	jà	jā	jă
23.	*dirty*	bí	ɓìŋ	ɓì	ɓɨ́l	ɓɨ̀lɨ́ŋ	ɓìlìŋ	dɨɾɨ́ŋ	ɓíl	ɓíl	líɾī̀ŋ
24.	*dog*	ìd͡ʒwá	jíɗwà	ɥìɥà	d͡zwâ	wìɗwà	ɗwà	ɗwá	ɗwà	ɗwá	ɗwă
25.	*drink*	ŋwá	ŋwà	nu̍̀	ŋwà	ŋwà	ŋwà	núʔú	ɲɔ́	ɲwə́	ɲɔ̌
26.	*drum*	dəŋ	dâŋ	gə́ŋgəŋ	dəŋ	dâŋ	dəŋ	dāŋ	dāŋ	dəŋ	dəŋ
27.	*eat*	təŋ	təŋ	təŋ	təŋ	təŋ	təŋ	təŋ	təŋ	təŋ	təŋ
28.	*egg*	pɪ̄ŋ	bɨŋ	bɪ̄ŋ	bùŋ	bùŋ	būŋ	báŋ	bəŋ	bəŋ	bəŋ
29.	*elephant*	sɵ̱	zò	ðəù	zòk	zɔ̀k	zɔ̀k	zúk	d͡ʒɔ̀k	d͡ʒúk̄	d͡ʒúk

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
30.	*eye*	nɨ́ŋ	nɨ̀ŋ	ɓwánú	núŋ	nɨ́ŋ	núŋ	núŋ	núŋ	núŋ	nû
31.	*fall*	ō	ò	ʔò	ō	ō	ò	jə́w	jə̀ù	wǭ	wō
32.	*fat*	ɲwī	nwì (hl̂w)	ɲwì	ɲwī	ɲwī	nwì	ɲwí	ɲwê	nwī	nwí
33.	*father*	tă	dà	dà	tō	tâ	dâ	tə́	tá	têt	tâ
34.	*fear*	sɨ́bí	ɓì	núdə́	vɨ́l	vɨ̀ɾí	vɨ̀lì	sùvɨ́lə́	vìlì	vílí	vílí
35.	*few*	t͡swənî	t͡swənî	t͡ʃĭdă̰ŋ	t͡ʃwəb	t͡ʃwəb	t͡ʃwəb	t͡swəb	tóp	tôp	tòp
36.	*fire*	d͡zwà	ɗwā:	ɥà	ɗwà	ɥà	lwà	lwá	lwâ	lwà	lwà
37.	*fish*	j̰ɨ̀ŋ	ɥ̰ɨ̀ŋ	θìŋ	θɨ́ŋ	sɨ́ŋ	θɨ́ŋ	seí	ʃəī	t͡ʃ̃ē	ʃĭjè
38.	*food*	nɨ̀ŋtə́ŋ	nɨ̀ŋtə̀ŋ	nɨ̀ŋtə̀ŋ	nùŋtə́ŋ	nɨ̀ŋtə́ŋ	nùŋtə́ŋ	núŋtə́ŋ	nūŋtə̀ŋ(ɛ̀)	nùŋtə́ŋ(ə́)	nūŋtə́ŋ(ɛ̄)
39.	*go*	tə́	tə̀	dɨ̀	tɛ́	tə́	tə̀	tá	ɗɔ̄	ɗwát	ɗɔ́t
40.	*grind*	nə́	nə́m	mè	nə̀m	nə́m	nə̀m	nə̀m	nə́m	ném	nə̀m
41.	*head*	kú	kù	jə̀kù	lò	lô	lō	ləū	lō	lō	lô
42.	*hear*	lí	lì	là	lî	lɨ́	là	làɾɨ́	lálɛ̄	láɾə̀	láɾɛ̀
43.	*her/him*	wə̀	wə̀	nə́	wə̀	wù	wù	nà	na᷇	nə̀	ná
44.	*hit*	g͡bə́	g͡bə́	g͡bá	g͡bə̀b	ɓóp	ɓwàp	g͡bə́b	g͡bə́b	g͡bə́b	g͡bə́p
45.	*hole*	bwà	ɓwà	ɓwá	ɓwà	ɓwà	ɓwà	ɓwà	ɓwà	ɓwà	ɓwa᷆

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
46.	*laugh*	mə́	màm	mɨí	mám	mə̌m	màm	màm	mám	mám	mám
47.	*leaf*	jàŋ	jàŋ	jàŋ	jɔk	jàŋ	jàŋ	jáŋ	ɲàŋ	jàŋ	jə̌ŋ
48.	*left (side)*	mì	mì	mɨì	mɛ̄	mɛ̄	màì	màī	màlɛ̀	márə̀	mɛ̄
49.	*leg*	kə́pū	kə́bù	kə́bò	bō	bō	bò	bō	vò	vo̱	vo̱
50.	*lie (down)*	lwé	lweì	ləú	ló	lə̌	ló (swà)	lʌū	ləú	ləú	ləú
51.	*light (not heavy)*	jéfɬlə́ŋ	jē	mùŋ̩	wènrû	jēb	ɓwànújə bí	jəblɨ	jə́blɛ̄	ɓùnóbɔ̀	jəblá
52.	*lion*	ɥa̱	ɥa̱:	zwà	zwa̱	zwà	zwà	zwa̱	d͡ʒwa̱	d͡ʒwɛ̱	nùŋbēdəŋə
53.	*liver*	ɲíŋí	nìnì	ɲì	ɲwíŋwí	ɲí	ɲi	ɲí	ɲí	ɲí	ɲī
54.	*metal*	bī	ɓì	ɓwí	ɓwí	ɓwí	ɓwí	bí	bí	bìp	bít
55.	*millstone*	ɲí	nì	ɲwàŋwì	ɲí	ɲí	ɲí	ɲí	ɲí	ní	nî
56.	*moon/month*	ìɥi̊	fíɥìm	fi̊	fī	fi	fî	pī	pí:	pí	pǐ
57.	*mosquito*	d͡ʒá	ɗjà	jà	bjà	ɓjá	ɓjà	ɓē	ɓē	ɓɛ́	ɓɛ́
58.	*mother*	nă	ná	nà	nê	nâ	nâ	na̱	na̱	ní	nâ
59.	*mountain*	té	teì	təì	təl	tál	tàl	təl	tàl	tál	kwʊî

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
60.	*mouth*	ŋwá	ŋwà	kə́ŋwá	ŋwá	ŋwá	ŋwà	nwa̰	ɲwà	ɲwá	ɲwa̰
61.	*nail (v)*	pí	pī	bə̀	pì	pí	pî	ɓɔ́k	pē	bɛ̀k	bɛ̀ɾɛ́
62.	*new*	à hú	à fû	à fù	à fú	à fú	á fú	lə fū:	á fù	kə́ fŭ	kə́ fu̯
63.	*night*	ṇ̀vì	dɨŋvɨ̀	nɨ́ŋ vē	vì	(nɨ̀ŋ) vì	(núŋ) vɨ̀	vōrə̀	vōlè	vɛ̀ɾɛ̀	vɛ̀rɛ̀
64.	*old (not new)*	à cwí	à cwì	cwɛ̀	à kū	kûŋ	á kú	kʊ̄ɾɨ́	kólí	kɔ̀rɛ̀	kóɾɛ̄
65.	*on*	kú	kù	kô	lō	lō	lò	ləú	lŏ	lwē	lwē
66.	*open*	bē	ɓəì	bò	ɓō	ɓō	ɓəù	bà	ábà	bà	ɓá
67.	*owl*	ɲɨ̌ŋì	nînì	ṇ̀hɨ́hɨ́	ɲíŋí	ɲɨ̌ŋî	ɲíŋī	ɲíŋī	ɓíʃī	bíʃì	bíʃī
68.	*pull*	fɨ̄	vɨ̀	gù	gɨb	gùb	gùb	gūb	gúb	gūb	gū̯b
69.	*pull up*	d͡zwū	dù	lù	lɨb	lùb	lùb	lūb	lúb	lùb	lūb
70.	*push*	tó	t͡sò	ló	tɔ̀k	tɔ́k	tɔ̀k	tɔ́k	tɔ́k	tɔ́k	tɔ́k
71.	*python*	mì	mì	mwí	mwî	mwì	ɓɨŋà	mí	mî	mílɨ̀m	mɨ̃
72.	*refuse*	lá	là	jə́	lá	lá	là	jɨbə̀	ɲóbā	lá	lá
73.	*rope*	bè	ɓəì	ɓəì	ɓɨ́l	bə́l	ɓə̀l	ɓə̀l	ɓə̄l	ɓə̄l	ɓél
74.	*salt*	t͡ʃɨkwɛ̃̀	zɨkwə̃ì	dwè	dē	dē	dəì	dəì	dəì	dɛ̯̄	dɛ̄

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
75.	*shame*	súkú	sɨkù	nɨjəù	súkú	súkú	θɨkù	sɨkəúlɨ́	ʃɨ̀kəùlé	kólójʃít	kóleʃít
76.	*shoot*	tá	tà	tà	tà	tá	tà	tă	tá	tá	tá
77.	*sleep*	nɨ́ŋlwé	nɨ̀ŋlwəì	nɨ̀ŋləù	nùŋló	nùŋ ló	nùŋló	nūŋləù	nūŋləù	nūnləú	núŋləû
78.	*spit*	t͡ʃɨ̀t͡ʃɨ́	t͡ʃɨ̀t͡ʃì	twìtwì	t͡swìt͡swî	t͡ʃwìt͡ʃwî	tùtwî	sùswê	ʃwíʃwě	twî	twē
79.	*squeeze*	kə̰́	kəm	kɨ̀	kəm	kə́m	kəm	kə̆m	kə́m	kə́m	kə́m
80.	*stab*	pə	bəù	bə	bɛ̄	bjɛ̄	bəì	bə	bə	bɛ̄t	bɛ̀t
81.	*stand*	t͡sɨ	d͡ʒì	cəú(θə́)	dɛ̄	dɛ̄	dē	dᵩì	dᵩì	dᵩ̄	dᵩ̄
82.	*stone*	té	teì	təì	tə̀l	tàl	tàl	tál	tál	tál	tál
83.	*swallow*	mī	mī	mī	mī	mí	mì	mī	mī	mī	mī
84.	*sweet potatoes*	kə́lə̀kó	kɨtákəù	kəɾkò	kə́tə̀kò	kɨ́tàkəú	kɨ́tágəù	kɨtágō	kɨ́tə̀ngū	cítàkɨú	ʃɨ́tə̀ŋcəû
85.	*thing*	nɨ̄ŋ	nɨ́ŋ ɓɨ	nɨ̀ŋ	nūŋ	nɨ̄ŋ	nùŋ	nūŋ	nūŋ	nūŋ	nūŋ
86.	*three*	tə́	nə́tə̀	nə̀tə̀	tɛ̄	tɛ̄	təì	tə́t	tɑ̄ːɾ	búnú	búnúŋ
87.	*throw*	wá	wà	tà	wà	wá	wă	wà	wā	wá	bjɨ̄ŋ
88.	*tie*	t͡sə́	t͡sə̀	cà	t͡ʃə̀b	t͡ʃə́b	θəp	səb	ʃə́b	lép	tép
89.	*tooth*	d͡ʒī	dĩ	jɨ̰jɨ	lɛ̄	lɛ̄	ləí	ləì	ləī	ləí	le᷄

S/No	Item	Jenjo	Munga Doso	Tha	Kyak	Moo	Lelau	Mak	Maghdi	Loo	Burak
90.	*tortoise*	kwə́ŋ	kwə̀ŋ	hṵ̀	kwóŋ	kwə́ŋ	kɔ́ŋ	kɔ́ŋ	kɔ́ŋ	kɔ́ŋ	kɔ̄ŋ
91.	*tree*	ká	kə̀	kə̀nɨŋ	kə̀b	kə̀b	kə̀p	ká̱b	ká̱p	ká̱p (dĭt̄)	dĭt
92.	*two*	jŭŋ	nə́ʔiù	nə̀jà	rə̀b	rə̀b	ɾə̀b	ɾāb	là:p	ɾə̀b	ɾə̀b
93.	*water*	mɨ́ŋ	mɨ̀ŋ	mɨcà	mūŋ	mūŋkwà m	mùnkì	mɨ́t͡ʃə́	mɨ̀ʃĭjè	mɛ̄	mɛ̄
94.	*we*	bɨ	ɓɨ	ɓì	ɓī	ɓí	bì	ɓí	ɓì	ɓí	ɓó
95.	*well*	bwàmɨ́ŋ	ɓwámɨ̀ŋ	wábù	ɓwàmūŋ	ɓwàmūŋ	ɓwāmū	ɓwàm wìn	ɓwáməì	túŋɾūŋmɛ̄	ɓwàmɛ́
96.	*what?*	bə́dé	ɓə̀	ɓà	ɓējá	má	ɓá	ɓá	ɓá	ɓă	ɓɛ̄
97.	*white*	fɪ̄	kɔ á vəw	jə́vù	vɨɾɪ̄m	(àm) vɨɾɨm	vɨɾɨm	vɪ̄ɾɨm	vùlùm	vɨ́rùm	vùɾūm
98.	*who?*	wədé	wə̀	ɗàjà	já	jâ	jìtɨn	wəì	wó	wəí	wəĭ
99.	*wind*	ɥá	ɥa̱	ɲàcà	wá	wá	wà	ɥâ	ɥá	wúbɛ̄	wəbɛ́
100	*word/speech*	bì	bì	ɲàhō	bà	bà	bā	sɔ́ká	ʃɔ̀	ʃɔ̄:	ʃɔ̀
101	*work*	ŋwátṹ	ŋwát͡sù m	nɨŋnà	núŋtó	nɨŋt͡ʃò	nūŋtō	nūn n̩tò	túmí	tŭmí	túmí
102	*you (pl)*	bə̀	ɓə	ɓá	ɓà	ɓà	ɓə̀	ɓí	jà	jɛ̄	jà
103	*you (sg)*	mə̀	mə̀	mə̀	mə̀	mà	mà	mwə̄	mɔ̀	mò	mɔ̀

4.3. SOUND CORRESPONDENCE

4.3.1. Consonant Correspondence Sets in Jen Cluster

From table 7 above, twenty three (23) consonant correspondence sets were seen. Some of the correspondence sets involve sound changes in some languages. The kinds of changes seen include, loss of implosion, change in the place of articulation, loss of voicing and weakening of frication. The correspondence sets are displayed in table 8 below:

Table 8

Ref #	Proto-Form	Dza	Munga Doso Tha	Kyāk	Moo	Lelau	Mak	Maghdi	Loo	Burak
4, 9, 45,73, 94, 95, 96	*ɓ	b	ɓ	ɓ	ɓ	ɓ	ɓ	ɓ	ɓ	ɓ
14, 24	*ɗ	dʒ	ɗ	-	ɗ	ɗ	ɗ	ɗ	ɗ	ɗ
61	*p	p	p	b	p	p	p	ɓ	p	b	b
28, 80	*b	p	b	b	b	b	b	b	b	b	b
27,33, 59, 76, 82	*t	t	t	t	t	t	t	t	t	t	t
20, 26,	*d	d	d	d	d	d	d	d	d	d	d
10,11, 79, 91	*k	k	k	k	k	k	k	k	k	k	k
1	*g	k	g	g	g	g	g	g	g	g	g
44	*gb	g͡b	g͡b	g͡b	g͡b	ɓ	ɓ	g͡b	g͡b	g͡b	g͡b
6, 12, 46,83, 103	*m	m	m	m	m	m	m	m	m	m	m

Ref #	Proto-Form	Dza	Munga Doso Tha	Kyăk	Moo	Lelau	Mak	Maghdi	Loo	Burak
2, 30, 40, 77	*n	n	n	n	n	n	n	n	n	n
25, 60	*ŋ	ŋ	ŋ	ɲ	ŋ	ŋ	ŋ	n	ɲ	ɲ	ɲ
32, 53, 55	*ɲ	ɲ	n	ɲ	ɲ	ɲ	ɲ	ɲ	ɲ	ɲ	ɲ
99	*ɥ	ɥ	ɥ	-	w	w	w	ɥ	ɥ	w	w
87, 98	*w	w	w	-	w	w	w	w	w	w	w
47	*j	j	j	j	j	j	j	j	ɲ	j	j
41, 42, 72	*l	l	l	l	l	l	l	l	l	l	l
92, 97 (63), (64)	*ɾ	-	-	-	r, ɾ	ɾ		ɾ	ɾ	l	ɾ	ɾ
63, 97	*v	f	v	v	v	v	v	v	v	v	v
56, 62	*f	h	f	f	f	f	f	f	f	f	f
29	*z	s	z	ð	z	z	z	z	d͡ʒ	d͡ʒ	d͡ʒ
15, 75	*s	s	s	θ	s	s	θ	s	ʃ	s	-
78	*tʃ	tʃ	tʃ	t	ts	tʃ	t	s	ʃ	t	t

From table 8, it is observed that Dza (Jenjo) has a pattern where starred voiced consonant sounds lose voicing and become voiceless. This sound change affected most of the plosives and the entire fricative sounds in the correspondence sets. Although in the case of the voiced labio-dental fricative [v], in item #63, Jenjo has [n̥vì] “night” which agrees with the other languages. But it can be argued that on this particular lexical item, the voicing is secured by the syllabic nasal [n̩] in the word initial position.

It is observed that out of the forty seven (47) consonants in the inventory, only twenty three (23) appeared as starred consonants. In addition to the twenty three (23)

starred consonants, there are about seven (7) consonant sounds that appear in correspondence series as follows: [θ], [ð], [ʃ], [t͡s], [t͡ʃ], [d͡ʒ], [r] and[h]. These are new sounds created by sound changes.

So far, the following seventeen (17) consonants are missing totally from the correspondence table: [ɻ], [ɟ], [c], [k͡p], [ʔ], [g̠], [ʒ], [x], [ɣ], [d͡z], [m̥], [m̩], [n̩], [ɲ̟], [j̊], [ɥ̊], and [ʍ]. Out of these seventeen sounds, the following six (6) occurred in just one language each: [g̠], [ɲ̟], [x], [m̥], [m̩], [ʍ]; three (3) occurred in just two languages each: [ɻ], [ɟ], [j̊], and the following four (4)occurred in just three languages each: [ʒ], [ɣ], [d͡z], [ɥ̊]. It was also observed that some of these sounds that occurred in few languages are rare even in the languages they occurred. A good example is the voiceless bilabial nasal [m̥] in Jenjo, which occurs only in one lexical item. The rest of them are likely to be sound changes due to environment. Thus, some may be allophones or in complementary distribution with other sounds. Again some of these are new sounds that occurred in words that do not have cognates in the other languages.

The sounds [c], [k͡p], and [ʔ] occurred widely in the cluster. But it was difficult to find a straight correspondence series that supports their inclusion in the correspondence table.

4.3.2. Vowel Correspondence Sets

From the cognates in table 7 above, about six (6) vowel correspondence sets were seen. The close-mid unrounded front vowel [e] was expected due to its wide occurrence in the cluster, but it was difficult to find a correspondence series from the data that supports its inclusion. The vowel correspondence sets are displayed in table 9 below:

Table 9

Ref #	Proto-Form	Dza	Munga Doso Tha	Kyăk	Moo	Lelau	Mak	Maghdi	Loo	Burak
4, 6, 9,12, 32,53, 54,55, 56,67, 71, 83	*i	i	i	i	i	i	i	i	i	i
19, 37	*ɨ	ɨ	ɨ	ɨ	ɨ	ɨ	ɨ	ɨ	ɨ	ɨ
26,27, 38,40, 46,47, 79, 91	*ə	ə	ə	ə	ə	ə	ə	ə	ə	ə
2, 22, 24,45, 60,76, 87, 95	*ɑ	ɑ	ɑ	ɑ	ɑ	ɑ	ɑ	ɑ	ɑ	ɑ
13, 30, 62	*u	u	u	u	u	u	u	u	u	u
31, 41,49	*o	u,o	u,o	o	o	o	o	o	o	o

From table 9 above, Jenjo and Munga-Doso has [u] items # 41, # 49 and [o] item # 31 under the starred close-mid back rounded vowel [o].

Out of the twelve (12) oral short vowels, nine (9) occurred widely in the cluster, and six (6) out of the nine have correspondence series in this wordlist. It was observed that of the modified vowels such as nasalized, breathy, glides and the lengthened vowels seen in the wordlist, none had a correspondence series to be included

in table 9 above. This is because these vowel features are not shared uniformly across the cluster. It can be argued that some of the lengthened vowels may be due to emphasis in pronunciation.

5 SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1. SUMMARY

The Jen language cluster is composed of ten languages. These languages were classified as related languages in *Ethnologue* and *Glottolog*, although these two do not agree in terms of the affiliation of the cluster, *Ethnologue* classified the languages under Adamawa while *Glottolog* classified them under Gur. Nevertheless, both sources recognize these languages as a unit. This comparative study set out with a task of seeking for phonological affinities between these ten languages. In order to achieve this task, three hundred (300) words of basic vocabulary were collected from all the daughter languages of the cluster. A synchronic inventory of sounds was taken from the three hundred words. The phonetically realized sounds include forty seven (47) consonant sounds, twelve (12) vowels, eight (8) breathy vowels and seven (7) nasalized vowels.

Furthermore, out of the three hundred (300) words of basic vocabulary in Jen cluster, one hundred and three (103) words were selected as cognate sets. Although there may be more from the data, the researcher concentrated on obvious cognates with resemblance in meaning and structure.

From the cognate sets drawn, sound correspondents were sought. Twenty three (23) correspondence sets were given for consonants. Six (6) correspondence sets were given for vowels.

5.2. CONCLUSIONS

The words of basic vocabulary in the Jen language cluster show about forty seven (47) consonant sounds, and twelve (12) oral vowels in the sound inventory tables. These tables are reliable because the researcher is a literate mother-tongue speaker of Jenjo, one of the languages of the cluster, and he is trained in phonetics. Prior to now, he has studied the Jenjo language and knows the phonemes of Jenjo. Thus, it will be easy to

pick similar sounds in the other languages, and similarly easy to notice strange sounds which are different from those found in Jenjo.

The correspondence tables show fewer sounds, only twenty three (23) out of forty seven (47) occurred in the consonant correspondence table. In addition to the twenty three, seven (7) sounds occurred in correspondence series with other regular sounds: [θ], [ð], [ʃ], [t͡s], [t͡ʃ], [d͡ʒ], [r] and[h]. These are new sounds created by sound changes. On the other hand, out of the twelve (12) oral short vowels, nine (9) occurred widely in the cluster, and six (6) out of the nine occurred in the correspondence tables. Again, some of the sounds in the inventory table are rare sounds even in the languages they occur, e.g [m̥] in Jenjo. And others are suspected to be allophones or in complementary distribution with other sounds, e.g [x], [s̪], [l̪].

Nevertheless, the shared phonological similarities between the languages of the Jen cluster are a good stepping ladder for future language development work in the languages. The shared similarities show the places where the languages can use the same letters, while the sound changes and the rare or new sounds show where some languages need extra letters in their orthography.

5.3. RECOMMENDATIONS

The research has been fun all the way, but there are hitches encountered in the course of the study. With these, the researcher made the following recommendations:

5.3.1. Designing helpful Wordlists

Despite the fine tuning of the wordlist for this research, there were lapses in the data collected. These include redundancy in the data collected, insufficiency of data to cover all the possible sounds of each language, and descriptive terms that do not contribute new roots. Example of redundant data include, item #4 “arm” and item #110 “hand”, item #72 “fat” and item #169 “oil”, item #93 “foot” and #135 “leg”, #156

“mountain” and #238 “stone” et cetera. This also includes descriptive phrase that do not contribute new roots. Consider the following examples from the data collected: item #92 “food” in all the languages is a combination of #254 “thing” and #63 “eat”. Item #279 in most of the languages is a combination of #119 “hole” and # 276 “water”. For this kind of research, redundant words just populate the data, with no relevance. To accommodate the chance of redundancy occuring, this wordlist was expanded to 300 instead of the initial 200 words.

Furthermore, the researcher discovered that the data collected was not sufficient to pick up all the possible phonetic sounds of each language. For example, Jenjo is shown as if it is deficient of the voiced palatal plosive [ɟ] and the voiced post-alveolar fricative [ʒ], whereas in Othaniel (Phonology Write-up) these were identified as phonemes of Jenjo. Example words include: /ɟɛ̀/ “beside”, /ɟə̀ŋ/ “chest”, /ʒɪ̀ʒɪ̀/ “falcon” and /ʒɪ̀d͡ʒáŋ/ “cricket”. In order to avoid or minimise this kind of issues, the researcher recommends that before carrying out a comparative study on a group of languages, a phonological analysis of at least one of the languages should be done like Jenjo in this study. This will help in the preparation of the wordlist. That way, the researcher should ensure all the phonemes of the studied language(s) are covered in the wordlist.

Collecting as many words as possible is good, but if the above situations are not handled, collecting the voluminous data will end up as unhelpful exercise. Instead, the quality of the wordlist should be improved such that there are no redundant data or unhelpful descriptive phrases.

5.3.2. Keeping Data Safe

During this research, the laptop of the researcher was stolen. That led to the loss of a lot of data stored in the computer. The data lost include all the audio recordings made during this research and the complete wordlists of three languages; Tha, Munga

Doso and Lelau. The researcher had to revisit the field again to get those data. While the other languages transcribed on paper had to be keyboarded again. Therefore, the researcher strongly recommends regular data backup to avoid losing data.

5.3.3. Language Development

Shared phonological similarities were observed between the languages of the Jen cluster. Nevertheless, there were also places where the languages differ in the cluster. Table 10 below shows the sounds that the other languages of the Jen cluster do not share with Jenjo and may likely need extra symbols to represent them:

Table 10

	Munga Doso	Tha	Kyãk	Moo	Lelau	Mak	Maghdi	Loo	Burak
ɓ	need	need	need	need	need	need	need	need	need
ɗ	need	need	need	need	need	need	need	need	need
ƙ	-	-	need	need	-	-	-	-	-
ʔ	need	need	-	need	-	need	-	need	-
ð	-	need	need	-	need	-	-	-	-
θ	-	need	need	-	need	-	-	-	-
ʂ	-	-	-	-	-	check	-	-	-
x	-	-	-	-	-	check	-	-	-
ɣ	-	-	-	-	check	check	check	-	-
m̩	-	check	-	-	-	-	-	-	-
l̩	-	-	-	-	-	check	-	-	-
ɾ	need	need	need	need	need	need	need	need	need
r	-	-	check	-	-	-	-	-	-
ɪ	-	-	-	-	-	-	-	check	check
ʊ	check	-	-	-	-	check	-	check	check
ʌ	-	-	-	-	-	check	-	-	-

However, in the table there were sounds that the researcher recommends should be checked in the languages they occur. Some of them may likely be allophones.

Below is an expanded orthography recommendation for the languages of Jen cluster from the findings of this research.

As mentioned in chapter 1, these languages are found in the North-East of Nigeria. Hence the transfer languages are; Hausa and English. Hausa is the language of wider communication while English is the official language. In these areas, people read Hausa Bibles, Hausa Hymns and other Hausa indigenous literatures such as Magana Jarice. With this in mind, the researcher made the following recommendations in regards to vowels:

i. About nine vowels /ɑ/, /e/, /i/, /o/, /u/, /ə/, /ɨ/, /ɛ/ and /ɔ/ are likely to be needed in almost all of the Jen cluster orthographies. This is especially true for the six vowels /i/, /ɨ/, /ə/, /ɑ/, /u/ and /o/ that showed up in the correspondence table. The researcher recommends that vowels /ɑ/, /e/, /i/, /o/, /u/ should be represented with the graphemes used in Hausa “a”, “e”, “i”, “o” and “u”.

The remaining four vowels /ə/, /ɨ/, /ɛ/, /ɔ/, Jenjo tried the subdots /ạ/, /ị/, /ẹ/ and /ọ/ but these were difficult to be picked by readers and they dissappear when texts are underlined. Plus, Jenjo has nasalized vowels which they mark with a tilde on top of vowels. Having diacritics on top and below letters e.g “ã̱” make writing a little difficult and was not easy for readers. If they were to go for the underlined diacritics /a̱/, /e̱/, /i̱/, and /o̱/ like Dadiya a neighbouring language, the same problems as the subdots will be faced. So, they opted for special characters “ə”, “ɨ”, “ɛ” and “ɔ”. This choice harmonizes with Mumuye, Bachama and other neighbouring languages with tentative orthographies. From the experience of Jenjo, the researcher recommends that the other sister languages of the cluster should adopt the special characters also.

ii. The near close near front vowel /ɪ/, the near close near back vowel /ʊ/ and the open-mid back unrounded vowel /ʌ/ are vowel sounds that do not occur in the Jenjo language. They occurred only in few languages and there were no minimal pairs to contrast them in the wordlist. Thus, the researcher recommends further studies on them.

iii. Other vowel features such as nasalization, breathiness, vowel length and diphthongs need more study in each language to facilitate better decision. For example, the nasalized and the breathy vowels occurred in Jenjo language. But the nasalized vowels have high functional load in contrasting meanings of words, while the breathy vowels has low functional load. Thus, nasalization is marked on vowels with a tilde (~), while the breathy vowels are left unmarked.

Below is a table displaying the recommendation of script and symbols for the vowel phonemes of the Jen cluster languages:

Phoneme	Dza Grapheme	Munga Doso Grapheme	Tha Grapheme	Kyāk Grapheme	Moo Grapheme	Lelau Grapheme	Mak Grapheme	Maghdi Grapheme	Loo Grapheme	Burak Grapheme
/i/	<i> “wi” voice	<i> “li” calabash	<i> “bim” ask	<i> “pi” beneath	<i> “pi” to nail	<i> “nyi” liver	<i> “bi” metal	<i> “pip” all	<i> “mi” breast	<i> “mi” swallow
/e/	<e> “be” rope	<e> “ze” flow	<e> “me” grind	<e> “tem” cold	<e> “de” salt	<e> “swe” snail	<e> “le” yesterday	<e> “jwe” ashes	<e> “ye” you (pl)	<e> “twe” spit
/ɛ/	<ɛ> “wɛ” yam	<ɛ> “liɨyɛ” today	<ɛ> “ɓədɛ” near	<ɛ> “tɛ” go	<ɛ> “dɛ” stand	-	<ɛ> “ləubyɛl” wing	<ɛ> “ɛ” give	<ɛ> “bɛt” stab	<ɛ> “bɛt” stab
/ɨ/	<ɨ> “fɨ” duck	<ɨ> “dɨ” take	<ɨ> “gɨw” gourd	<ɨ> “gɨp” pull	<ɨ> “lɨ” hear	<ɨ> “tɨgya” rabbit	<ɨ> “lɨsɨye” woman	<ɨ> “shɨp” crocodile	<ɨ> “shɨp” crocodile	<ɨ> “lɨn” name
/ə/	<ə> “fə” canoe	<ə> “kə” tree	<ə> “nə” he/she	<ə> “kətəko” sweet potatoes	<ə> “tə” go	<ə> “ləm” sharp	<ə> “kəb” tree	<ə> “bə” stab	<ə> “təng” eat	<ə> “kəfyɔk” bow

Phoneme	Dza Grapheme	Munga Doso Grapheme	Tha Grapheme	Kyāk Grapheme	Moo Grapheme	Lelau Grapheme	Mak Grapheme	Maghdi Grapheme	Loo Grapheme	Burak Grapheme
/ɑ/	<a> “ya” rainbow	<a> “wa” throw	<a> “la” hear	<a> “ta” shoot	<a> “zwa” lion	<a> “fa” rub	<a> “ba” hair	<a> “tal” stone	<a> “ya” dig	<a> “ma” sweet
/u/	<u> “hu” grass	<u> “lulub” warm	<u> “mu” guineacorn	<u> “suku” shame	<u> “a fu” new	<u> “nunglo” sleep	<u> “bu” gray hair	<u> “shu” suck	<u> “nung” eye	<u> “nungshe” soup
/o/	<o> “to” push	<o> “kəlo” basket	<o> “ɓo” lift	<o> “lo” head	<o> “bo” leg	<o> “lo wayi” sky	<o> “vorə” night	<o> “job” wash	<o> “wo” fall	<o> “ɗom” sheabutter tree
/ɔ/	<ɔ> “tɔ” odour	-	<ɔ> “lɔyong” warm	<ɔ> “tɔk” push	<ɔ> “zɔk” elephant	<ɔ> “zɔk” elephant	<ɔ> “ɗɔk” basket	<ɔ> “lɔk” swell	<ɔ> “tɔk” push	<ɔ> “tɔl” skin

Concerning the consonants, the researcher made the following recommendations

i. The implosives /ɓ/, /ɗ/ and /ƙ/

Jenjo does not have these three in its orthography but Hausa has them. Therefore, the researcher recommend that those sister languages with these sounds should follow Hausa for transferability purposes. Hausa chose the IPA symbols “ɓ”, “ɗ” and “ƙ” as the graphemes to represent these three phonemes.

ii. The glottal stop /ʔ/

Moo, Loo, Mak, Munga Doso and Tha have the glottal stop [ʔ], while Jenjo does not have this phoneme. Hausa has the glottal stop /ʔ/ and chose the apostrophe (’) as the grapheme to mark it. The recommendation of the researcher is to follow Hausa as suggested in (i) above.

iii. The interdentals /θ/ and /ð/

From the inventory of sounds, Kyãk, Lelau and Tha have the voiceless interdental fricative [θ] and the voiced version [ð]. Jenjo and Hausa do not have these two phonemes in their orthographies, but English does. English represented these two with the same grapheme, a diagraph “th”. But the researcher recommends that the voiceless interdental fricative /θ/ should be represented with the grapheme “th” while the voiced interdental fricative /ð/ should be represented by the grapheme “dh”.

iv. The velar fricatives /x/ and /ɣ/

Mak has the voiceless velar fricative [x] which Jenjo do not have. But this sound should be checked for contrast, it may likely be an allophone. But if it is found out that it is truly a phoneme, the researcher recommends that Mak represents this with the diagraph “kh”. On the other hand, Mak, Lelau and

Maghdi have the voiced velar fricative [ɣ]. Again this sound does not occur in Jenjo, and the researcher has a feeling that it should also be checked as in the case of [x]. Nevertheless, the researcher recommends that the languages that have [ɣ] should represent it with the diagraph “gh”.

v. [s̪], [l̪] and [r]

The dental sounds [s̪], [l̪] and the trill [r] are the most suspected sounds to be allophones or probably transcription error. The researcher recommends further studies on them.

The table below displays the suggestions of script and symbols for consonant phonemes in each language of the cluster:

Phoneme	Jenjo Grapheme and example word	Munga Doso Grapheme and example word	Tha Grapheme and example word	Kyak Grapheme and example word	Moo Grapheme and example word	Lelau Grapheme and example word	Mak Grapheme and example word	Maghdi Grapheme and example word	Loo Grapheme and example word	Burak Grapheme and example word
/ɓ/	-	<ɓ> “ɓu” husband	<ɓ> “ɓo” lift	<ɓ> “ɓuk” foot	<ɓ> “ɓil” black	<ɓ> “ɓuchi”	<ɓ> “ɓip” ask	<ɓ> “ɓilim” black	<ɓ> “nungɓəl” animal	<ɓ> “ɓəklɛ” bad
/ɗ/	-	<ɗ> “ɗi” horn	<ɗ> “ɗə” give	<ɗ> “ɗyok” wash	<ɗ> “ɗe” calabash	<ɗ> “ɗok” basket	<ɗ> “ɗur” demolish	<ɗ> “ɗi” clean	<ɗ> “ɗwa” dog	<ɗ> “ɗot” go
/ƙ/	-	-	-	<ƙ> “ƙim” tongue	<ƙ> “ƙika” today	-	-	-	-	-
/b/	<b> “bi” song	<b> “bu” feet	<b> “bɨbəi” many	<b> “bɛ” stab	<b> “bung” crab	<b> “lubəi” to call	<b> “bɨng” crab	<b> “bə̃i” cassava	<b> “bilɨ” earth	<b> “bile” flower
/p/	<p> “pa” barn	<p> “pi” to nail	<p> “pyɛ̃” narrow	<p> “pi” beneath	<p> “pi” to nail	<p> “piswa” under	<p> “pɨ” lift	<p> “pip” all	<p> “pəi” bite	<p> “pi” moon
/d/	<d> “du” nerve	<d> “də” give	<d> “dule” fog	<d> “dɛ” all	<d> “dəng” dance	<d> “dangguk” bush	<d> “dəba” count	<d> “dəng” dance	<d> “dɔb” clay	<d> “dumkɔlɔ” carving axe
/t/	<t> “te” stone	<t> “tə” narrow	<t> “ta” shoot	<t> “to” father	<t> “te” cloud	<t> “təi” cloud	<t> “təma” cold	<t> “təng” eat	<t> “tulɛlɛ” earthworm	<t> “top” few
/ɟ/	<gy> “gyɛ” beside	-	<gy> “gyugyə” mud	-	-	<gy> “tigya” rabbit	-	-	-	-

Phoneme	Jenjo Grapheme and example word	Munga Doso Grapheme and example word	Tha Grapheme and example word	Kyak Grapheme and example word	Moo Grapheme and example word	Lelau Grapheme and example word	Mak Grapheme and example word	Maghdi Grapheme and example word	Loo Grapheme and example word	Burak Grapheme and example word
/c/	<ky> kya “shoulder”	<ky> “kyem bi” think	<ky> “kyɛ̃” to finish	<ky> “kyən” near	<ky> “kyen” wing	<ky> “kyəl” flow	<ky> “kyal” flow	<ky> “wu ci” to live at a place	<ky> “kyundɨrɨ” dust	<ky> “shitəngkyəu” potatoes
/ɡ/	<g> “gã” digress	<g> “gamvau” thunder	<g> “ga mɨng” swim	<g> “ge” fencing mat	<g> “gangfɨr” thunder	<g> “guk” grass	<g> “gəb” answer	<g> “gɔng” big	<g> “gapen” hunt	<g> “nigɔ” heart
/k/	<k> “ku” head	<k> “kəm” squeeze	<k> “wəkəki” porcupine	<k> “kuluk” gourd	<k> “kulam” twist	<k> “kuluk” gourd	<k> “korɨ” fencing mat	<k> “ka” grass	<k> “kɔm” fog	<k> “wekuma” cassavva
/g͡b/	<gb> “gbə” hit	<gb> “gbə” hit	<gb> “gba” hit	<gb> “gbəb” hit	-	-	<gb> “gba” split	<gb> “gbəb” hit	<gb> “gbɨrɛ” groundnuts	<gb> “gbɛnɛ” far
/k͡p/	<kp> “kpə̃” tight	<kp> “kpam” all	-	<kp> “kpãlɛ” many	<kp> “kpã” many	<kp> “kpãding” many	<kp> “lɨkpãli” many	-	<kp> “kpar” straight	<kp> “kpakə” scratch
/ʔ/	-	<’> “nə’iu” two	<’> “ ’o” to fall	-	<’> “ ’iyɔk” wash	-	<’> “ma’in” good	-	<’> “ ’ɛlɛ” year	-
/ð/	-	-	<dh> “dhobo” walk	<dh> “dhɨmməng” finish	-	<dh> “dhimnu” hundred	-	-	-	-

Phoneme	Jenjo Grapheme and example word	Munga Doso Grapheme and example word	Tha Grapheme and example word	Kyak Grapheme and example word	Moo Grapheme and example word	Lelau Grapheme and example word	Mak Grapheme and example word	Maghdi Grapheme and example word	Loo Grapheme and example word	Burak Grapheme and example word
/θ/	-	-	<th> “ithana” today	<th> “thɨng” fish	-	<th> “tha” year	-	-	-	-
/v/	<v> “və” home	<v> “vɨ” wash	<v> “va” wash	<v> “vuk” dust	<v> “vɨm” fight	<v> “vɨ la” to write	<v> “bɔkvəi” to yell	<v> “vulum” white	<v> “ve” today	<v> “vɛrɛ” night
/f/	<f> “fo” dust	<f> “fi” sun	<f> “fa” rub	<f> “fa” rub	<f> “fi” gray hair	<f> “fa” wipe	<f> “fəm” swell	<f> “falɛ” sun	<f> “fɨləɓəng” play	<f> “fakwin” twenty
/z/	<z> “za” vulture	<z> “ze” flow	<z> “zwa” lion	<z> “zo” walk	<z> “zi” blood	<z> “zwan” mortar	<z> “zung” rub	-	-	-
/s/	<s> “sa” island	<s> “sa” carving axe	<s> “sɨ” crocodile	<s> “suku” shame	<s> “su” bury	<s> “swazwi” sand	<s> “sɨkəulɨ” shame	<s> “swim” one	<s> “semlonyɛk” egret	-
/ʃ/	<sh> “shɨ” crocodile	-	<sh> “shi” wife	-	-	<sh> “shoklam” earthworm	-	<sh> “shop” clay	<sh> “shɨp” crocodile	<sh> “shəp” fight
/ʒ/	<zh> “zhĩzhĩ” falcon	-	<zh> “zhi” flow	-	-	-	-	<zh> “zhula” groundnuts	<zh> “bəngzhwe” sand	-

Phoneme	Jenjo Grapheme and example word	Munga Doso Grapheme and example	Tha Grapheme and example word	Kyak Grapheme and example word	Moo Grapheme and example word	Lelau Grapheme and example word	Mak Grapheme and example word	Maghdi Grapheme and example word	Loo Grapheme and example word	Burak Grapheme and example word
/x/	-	-	-	-	-	-	<kh> “kwəxəm” fog	-	-	-
/ɣ/	-	-	-	-	-	<gh> “ɗigha” wash	<gh> “nungɓagha” earthworm	<gh> “wəghməi” shoe	-	-
/t͡s/	<ts> “tsa” hair	<ts> “tswəni”	-	<ts> “tswitswi” saliva	-	-	<ts> “tswəb” few	-	-	-
/d͡z/	<dz> “dzɨdzɨ” frying pan	<dz> “dzam” hair	-	<dz> “dzwa” dog	-	-	-	-	-	-
/t͡ʃ/	<ch> “chichi” saliva	<ch> “chi” front	<ch> “chiɗang” few	<ch> “chəb” tie	<ch> “cho” do	<ch> “ɓuchi” arrow	<ch> “mɨchə” water	-	<ch> “che” fish	-
/d͡ʒ/	<j> “jɛnɨ” today	<j> “jujwə” mud	<j> “jwi dwi” sing	<j> “ju” smoke	<j> “jen” shield	<j> “jwan” straight	<j> “tija” rabbit	<j> “ja” waterpot	<j> “job” wash	<j> “jab” stick
/m/	<m> “mɨngmi” milk	<m> “mi” me	<m> “mumu” heavy	<m> “mung” water	<m> “mura” dream	<m> “mung” rain	<m> “mi” python	<m> “wuma” river	<m> “məm” laugh	<m> “mɛ” left side
/m̥/	<hm> “hmɨ” five	-	-	-	-	-	-	-	-	-

Phoneme	Jenjo Grapheme and example word	Munga Doso Grapheme and example word	Tha Grapheme and example word	Kyak Grapheme and example word	Moo Grapheme and example word	Lelau Grapheme and example word	Mak Grapheme and example word	Maghdi Grapheme and example word	Loo Grapheme and example word	Burak Grapheme and example word
/m̩/	-	-	<m> “mbe” fight	-	-	-	-	-	-	-
/n/	<n> “na” hand	<n> “nɨng” eye	<n> “nə” fetch	<n> “nunglo” sleep	<n> “na” hand	<n> “nəi” four	<n> “nung” eye	<n> “nyina” good	<n> “najuna” finger	<n> “nəm” grind
/n̩/	<n> “ntwe” chameleon	<n> “n” I	<n> “nhĩhĩ” owl	-	-	<n> “ndhirak” raven	<n> “nun nto” work	-	-	-
/ɲ/	<ny> “nyɛ” jest	<ny> “nywam” cobra	<ny> “nyakya” wind	<ny> “nyə” meat	<ny> “nyi” bitter	<ny> “nyinyi” owl	<ny> “nywen” straight	<ny> “nyələng” stick	<ny> “nyet” sharp	<ny> “nyet” sharp
/ŋ/	<ng> “ngə” sour	<ng> “gwəng” answer	<ng> nggələng “crab”	<ng> “ngɔ” breathe	<ng> “ngɔ” breathe	<ng> “ɓɨnga” python	<ng> “ngəmu” cobra	<ng> “ɗənga” many	<ng> “ngəmuk” cobra	<ng> “ləngа” spider
/l/	<l> “lə” tongue	<l> “kəlo” basket	<l> “ləi” calabash	<l> “lo” head	<l> “logwam” earth	<l> “ladĩn” sweet	<l> “lɨka” skin	<l> “lɔk” swell	<l> “yɨlɨ” sky	<l> “kemlem” snake
/ɾ/	-	<r> “mwirɨ” dream	<r> “kərko” potatoes	<r> “rab” two	<r> “zɨrak” raven	<r> “ɓar” to cut	<r> “ɗɨra” road	<r> “dɔrəb” mud	<r> “pɨrɛ” to scratch	<r> “narɛ” seven
/j/	<y> “yɛ” chicken	<y> “yivɨ” person	<y> “yɨ” take	<y> “yu” man	<y> “yɨng” full	<y> “yithə” full	<y> “yɨta” guineacorn	<y> “yəu” fall	<y> “yak” flow	<y> “ɓiya” gruel

Phoneme	Jenjo Grapheme and example word	Munga Doso Grapheme and example word	Tha Grapheme and example word	Kyak Grapheme and example word	Moo Grapheme and example word	Lelau Grapheme and example word	Mak Grapheme and example word	Maghdi Grapheme and example word	Loo Grapheme and example word	Burak Grapheme and example word
/j̊/	<hy> “hyəng” scorpion	<hy> “hyɛ̃” red	-	-	-	-	-	-	-	-
/ɥ/	<yw> “ywe” root	<yw> “ywem” root	<yw> “ywa” stomach	-	<yw> “ywa” fire	<yw> “ywimdhən” child	<yw> “ywerna” finger	<yw> “ywe” blood	-	<yw> “ywa” bitter
/ɥ̊/	<hyw> “hywe” earthworm	<hyw> “hywə” ten	<hyw> “hywiye”	-	-	-	-	-	-	-
/w/	<w> “wɛ” yam	<w> “wə” come	<w> “wə” come	<w> “wap” shake	<w> “wiɗwa” dog	<w> “wa” stomach	<w> “wo” walk	<w> “wa” throw	<w> “wikɨmə” cassava	<w> “wo” fall
/ʍ/	<hw> “hwə” fight	-	-	-	-	-	-	-	-	-
/h/	<h> “ha” year	<h> “ha” dig	<h> “ho” count	<h> “har” swell	<h> “hɨ lə” to live	<h> “har” swell	-	-	-	-

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