CHAPTER 2
A BRIEF DESCRIPTION OF PHONOLOGY

2.0 Introduction

This chapter gives the initial phonology statement of Geba. The chapter begins with word-level stress and syllable types. It then moves on to a phonological analysis which includes the segmental phonology of the consonants and the vowels. Next, it turns to allowable syllable structures and possible sequences of consonants and vowels. A brief discussion of tone contrast is also included.

The phonological data was collected from a Geba native speaker who was born in the village of Boma which is in Pyinmana Township, Mandalay Division. It was then checked with another native speaker. The data is based on a 436 item wordlist which is attached in the appendix of this thesis. The words were first transcribed as spoken and then each word was recorded three times for further reference and checking. After that, each word was grouped by initial consonant, vowel, and tone group.

2.1 Word-level stress

Two kinds of syllables, major and minor syllables, occur in Geba. Major syllables can consist of a complex onset and nucleus. [CCV]. Minor syllables can only consist of [CV].

A Geba word is a sequence of phonological syllables, one of which has the primary stress. In citation form, the first major syllable is stressed and word-initial minor syllables are never stressed.

In (1), the stress is found on the first syllable major syllable.

(1)   ˈl̥á wó?   thunder

In (2), the stress occurs on the second syllable but the first syllable is a minor syllable.

(2)   *ɔ̄. ˈsʰ ̀ùʔ*   feather

All monosyllabic words and grammatical particles are stressed but sometimes sentence and phrasal intonation may change this.

For example, stress always occurs in the monosyllabic word ̥lɛ́ 'moon'. But the grammatical particle *ɓɛ̀* 'have to' or 'should' has variable stress patterns. If *ɓɛ̀* is an auxiliary verb meaning 'should', which expresses suggestion, stress occurs on the following main verb; but, if *ɓɛ̀* means 'have to', which expresses 'command', stress occurs on the *ɓɛ̀* particle. Examples (3) show the particle *ɓɛ̀* without stress as in example (3a) and with stress as in example (3b), and the particle *lɛ̀* 'go' also changes stress depending on the use of *ɓɛ̀.*

3(a)   nə̄   ɓɛ̀   ˈlɛ̀   tʃaúŋ (suggestion)

3(b)   nə̄   ˈɓɛ̀   lɛ̀   tʃaúŋ (command)

2.2 Syllable structure

As stated above, there are two kinds of syllables: major and minor syllables. The maximum syllable template for major syllables in Geba consists of a complex onset, nucleus, and glottal stop as coda [CCVC]. The minimum syllable template for major syllables is [CV]. The rhyme is composed of nucleus and possibly a glottal stop coda. The following sections discuss the structure of major and minor syllables in Geba.

2.2.1 Major syllables

There are three kinds of major syllables. They are CV, CCV and CVC. All the major syllables carry tone.

The maximum major syllable template is shown in (4).

(4) $C_1(C_2)VT$

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where C_1 is any consonant, C_2 is /w,j,r,l/, V is any vowel, and T is tone.

Table (3) shows examples of the major syllable types which occur in Geba.

Syllble type	Geba	Wordlist no:	English
CVT	$s^h\acute{\varepsilon}$	#318	'to sell'
CCVT	$bw\acute{e}$	#317	'to buy'

Table 3 The major syllable structures in Geba

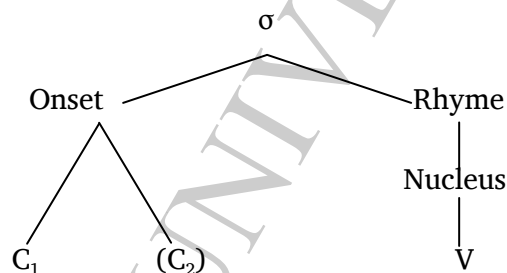Figure (7) shows the 'Geba major syllable' structure.

Figure 7 Geba major syllable structure

There is no coda in Geba but Burmese loan words appear as coda.

2.2.2 Minor syllables

The minor syllable has a reduced set of possible onsets and vowels. Minor syllables always carry mid tone or non-distinctive tone. Minor syllables consist of an optional initial consonant followed by shwa *ə.* Figure (8) shows the 'Geba minor syllable' structure.
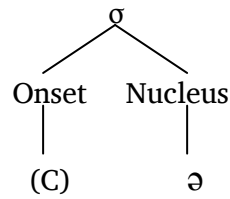
(8)

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              σ
            /   \
       Onset    Nucleus
          |        |
         (C)       ə
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<p align="center">Figure 8 Geba minor syllable structure</p>

Figure (9) is an exhaustive list of minor syllables in Geba.

(9)

/l/ ⎫
/θ/ ⎪
/m/ ⎪
/b/ ⎬   /ə/
/t/ ⎪
/g/ ⎪
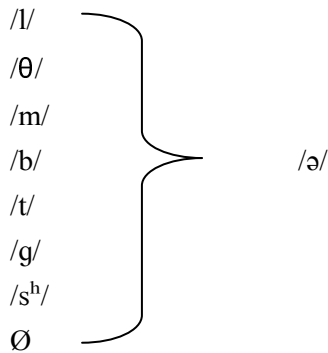/sʰ/ ⎪
Ø   ⎭

<p align="center">Figure 9 An exhaustive list of minor syllables</p>

A minor syllable occurs without stress; only major syllables carry stress. There are no implosives, aspirated stops, voiceless segments, or alveolar trills occuring with minor syllables.The following examples in (5) show minor syllables with initial consonants.

(5) CV   *lə̄ mɔ̀*   mouth
           θə̄.ʔé   ginger
           mə̄.nà.θὲʔ   jack fruit
           gə̄nɔpjí   butterfly

The examples in (6) show minor syllables without initial consonants.

(6) V   *ə̄dê̂ʔ*   wing

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			feather
$\bar{\partial}s^{h}\grave{u}\textipa{P}$		feather
$\bar{\partial}\mathring{w}\grave{i}\textipa{P}$		to fly

2.3 Consonant phonemes

Geba has (34) consonant phones that appear to be phonemic including five which occur rarely. Those phonemes that occur rarely are enclosed in parenthesis in the table below, and future research may prove these to be allophones. The consonant phonemes for Geba are given in Table (4).

		Labial	Dental	Alveolar	Palatal	post-alveolar	Velar	Glottal
Plosive	vl asp vl vd	pʰ p b		tʰ t d		tʃʰ (tʃ) dʒ	kʰ k g	ʔ
Implosive	vd	ɓ		ɗ				
Nasal	vl vd	m̥ m		n̥ n			(ŋ)	
Fricative	vl asp vl vd		θ	sʰ s		ʃ	(x) (ɣ)	h (ɦ)
Trill	vd			r				
Lateral approximant	vl vd			l̥ l				
Approximant	vl vd	w̥ w			j			

Table 4 Geba consonant phonemes

Geba has three types of plosives: voiceless aspirated, voiceless unaspirated, and voiced unaspirated. Two voiced implosives are also found. Geba also has eight

voiced and voiceless fricatives including three rare phones (x), (ɣ) and (ɦ). It has voiced and voiceless nasals, one alveolar trill, voiced and voiceless lateral approximants, voiced and voiceless bilabial approximants, and a voiced palatal approximant. The phonemes in the parenthesis such as (x) and (ɣ) appear in free variation with the glottal fricative /h/ and labial approximant /w/. In the data collected, some free variations occur. Free variations seem to occur often among Geba speakers. The pairs in (7) show the free variations that occur in Geba.

(7)   (a) /h/ and /ʃ/

           [hì] ~ [ʃì]   'house'

    (b) /w/ and /ɣ/

           [ə̄wò] ~ [ə̄ɣò]   'rib'

    (c) /h/ and /x/

           [hò] ~ [xò]   'bamboo'

    (d) /sʰ]/and /ʃ/

           [sʰìʃá] ~ [ʃìʃá]   'afraid'

The phoneme (ŋ) can be found in words borrowed from Burmese, for example, *beíŋ* 'opium'. The phoneme /ɦ/ does not occur in this data but in other text /ɦà/ is used as a question word. Example (8) shows the phoneme /ɦ/ in a question word in Geba.

(8)   nə̄   kə̄   lè   tʃaúŋ   ɦà

       2S   will   go   school ILL.F

       PRN   AUX   V   N   INTER

       Will you go to school?

2.3.1 Consonants phonemes contrasts

The following example (9) shows consonant phoneme contrasts between phonetically similar segments. They are illustrated in analogous environments or minimal pairs.

(9)	(a) [pʰ]-[p]	*pʰú*	'belly'	*pú*	'to be thin'	C.I.E
	(b) [kʰ]-[k]	*kʰòʔ*	'deer'	*kòʔ*	'head'	C.I.E
	(c) [p]-[b]	*ʃópòʔ*	'to launder'	*θábò*	'sing'	C.A.E
	(d) [t]-[d]	*tə̄ŋɔ́la᷄*	'kneel down'	*də̄glɔ̀θɛ̀ʔə̄lé*	'red pepper'	C.A.E
	(e) [pʰ]-[b]	*pʰɛ́ʔ*	'ash'	*ʔòbɛ́*	'duck'	C.A.E
	(f) [tʰ]-[d]	*tʰɔ́*	'drum'	*dó*	'village'	C.I.E
	(g) [ʔ]-[h]	*ʔì*	'give'	*hì*	'house'	C.I.E
	(h) [k]-[h]	*kòʔ*	'head'	*hòʔ*	'fire wood'	C.I.E
	(i) [m]-[n]	*mɛ̀θí*	'kill'	*dànɛ̀ʔ*	'what'	C.A.E
	(j) [m]-[w]	*ə̄mòʔ*	'mother	*ə̄wò*	'rib'	C.A.E
	(k) [s]-[sʰ]	*sàʔtʰìʔ*	'see'	*sʰàʔ*	'push'	C.A.E
	(l) [s]-[ʃ]	*sɔ̀pwɛ́*	'sneeze'	*ʃɔ̀míɓàʔ*	'dream'	C.A.E
	(m) [θ]-[d]	*θí*	'you'	*dí*	'to be thick'	C.I.E
	(n) [l]-[n]	*lòʔ*	'stone'	*ə̀nò*	'that'	C.A.E
	(o) [l]-[l̥]	*sʰò̀ʔlà*	'grow plant'	*l̥áwóʔ*	'thunder'	C.A.E
	(p) [m]-[m̥]	*ə̄mī*	'name'	*m̥ìʔ*	'fire'	C.A.E
	(q) [g]-[r]	*ə̄gòʔ*	'to be hot'	*θə̄ròʔdɛ̀ʔ*	'house wall'	C.A.E

2.3.2 Consonants description

Table (5) shows examples of (29) syllable initial, word initial and word medial consonants which are commonly found in Geba. All of the consonants appear syllable initial and word medial position except for /dʒ/ which appears only in the wordinitial position.

segments	syllable initial/word initial		syllable initial /word medial	
/p/	pɔ́ʔ	'vomit'	tʰwèpètʰí	'spit'
/pʰ/	pʰúpétʰà	'saited'	sìsòpʰóʔ	'motar'
/b/	bòbwɛ́	'how many people'	bòbwɛ́	'how many people'
/ɓ/	ɓákʰlè	'exchange'	ə̄ɓá	'yellow'
/m/	mètʰáʔ	'forehead'	sùlèmèká	'elbow'
/m̥/	m̥ìʔ	'fire'	làkʰóʔm̥úʔ	'dust'
/w/	wàʔ	'to scratch'	tə̄wènɔ̀ʔ	'disgusting'
/w̥/	w̥èʔlə̄mɔ̀	'to whistle'	ə̄w̥é	'to dry'
/θ/	θə̄hɛ́	'to hear'	mùθéràʔ	'to be drunk'
/tʰ/	tʰwèpètʰí	'to spit'	sùtə̄tʰwèʔ	'right side'
/t/	tə̄wènɔ̀ʔ	'disgusting'	nìgùtə̄ʔó	'to be deaf'
/d/	də̄nèsə̄ɓó	'pestle'	kʰàʔdùʔ	'thigh'
/ɗ/	ɗélèʔ	'house lizard'	θə̄rò̀ʔdɛ̀ʔ	'wall of house'
/sʰ/	sʰɔ́ʔtʰò̀ʔ	'to stand'	ə̄sʰùʔ	'feather'
/s/	sɔ̀pwé	'to sneeze'	tə̄sɔ̀	'some'
/n/	nìgùtə̄ʔó	'to be deaf'	gə̄nà	'to shiver'
/n̥/	n̥ádɛ̀ʔ	'needle'	ə̄lùn̥ú	'to smell'
/r/	rə̄	'to choose'	θə̄rùʔ	'to suck'
/l/	làkʰò̀ʔ	'earth, soil'	ɗélè	'house lizard'
/l̥/	l̥áwàlí	'lightning'	θòl̥èʔ	'leaf'
/j/	jùpʰò̀ʔ	'rat'	mìjɔ́	'cat'
/ʃ/	ʃé	'chicken'	ə̄ʃèʔ	'flesh'
/tʃʰ/	tʃʰí	'to kick'	ə̄tʃʰíkèʔ	'to be bad'
/dʒ/	dʒì	'two'		
/kʰ/	kʰè̀ʔ	'to shoot'	tʰáʔkʰò̀ʔ	'to float'
/k/	kə̄sʰá	'elephant'	θékòkʰrɔ̀ʔ	'to snore'
/g/	gə̄nà	'to shiver'	ə̄gə̄lè	'shadow'
/ʔ/	ʔà̀	'to eat'	l̥èʔà	'to lick'
/h/	hàʔ	'to weep	θèhɛ́	'to know'

Table 5 Consonant descriptions of Geba

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In table (6) are examples of the five rare phones /tʃ, ŋ, x, ɣ, ɦ/ occuring as word initial and/or syllable initial in borrowed Burmese words, free variation phonemes or as a question word.

segments	tenical names	word initial/syllable initial	word final	comment
/tʃ/	voiceless palato-alveolar sibilant affricate	tʃéθòbó 'garlic'		Burmese borrowing
/ŋ/	voiced velar nasal		beíŋ 'opium'	Burmese borrowing
/x/	voiceless velar fricative	xò/hò 'bamboo'		free variation
/ɣ/	voiced velar fricative	ɘ̄ɣò/ɘ̄wò 'rib'		free variation
/ɦ/	voice glottal fricative	ɦà 'question word'		tag question

Table 6 Description of Geba rare consonants

2.3.3 Consonants clusters

Four consonant phones /w, l, j, r / occur as the second member of consonant clusters. There are twenty two consonant clusters observed in this data. They are: /mw, kl, pʰl, kʰl, kw, kʰw, gl, gw,tʰwl, mj, bl, kʰr, kr, pl, bw, θw, bj, sw, pw, pj, ʃw/.

Table (7) shows the occurrence of the first consonant (C$_1$) and the second (C$_2$) consonant of the consonant clusters in Geba.

	/pʰ/	/p/	/k/	/kʰ/	/g/	/m/	/b/	/tʰ/	/θ/	/s/	/ʃ/
/w/	-	+	+	+	+	+	+	+	+	+	+
/l/	+	+	+	+	+	-	+	-	-	-	-
/r/	-	-	+	+	-	-	-	-	-	-	-
/j/	-	+	-	-	-	+	+	-	-	-	-

Table 7 Co-occurrence of C1 and C2 in Geba

According to the above table, the second member of the clusters must be one of
/ w, j, r, l /.

/*pʰ*/ occurs only with */l /* and /*tʰ*/, /*θ* /, */s/*, /*ʃ* / occurs only with */w /*. There are
no trills, lateral approximants, approximants, liquids, voiceless nasals,
semivowels, or implosives that appear as the first member of a cluster.

The co-occurrence of C_1 and C_2 is restricted to four patterns to form consonant
clusters. The following patterns are based on the 436 Geba wordlist.

(a)-w- cluster (C_1 w) pattern

When C_2 is /w/, C_1 must be a plosive, fricative or nasal /*p, k, kʰ, tʰ, m, b, θ,
s, ʃ, g* /. The ten clusters found are exemplified below.

mwɛ̀ʔdānī	'tomorrow'
kwà?θɩ́ '	betel nut'
θɛ̀kʰwɛ̀ʔ	'corn'
tʰwìʔ	'dog'
ābwèʔ	'intestine'
θwìʔ	'blood'
swé	spoon'
sɔ̀pwé	'to sneeze'
ʃwéʔm̥éʔ	'to burn'
ātāgwè	'to bend'

(a) -l- cluster (C$_1$ l) pattern

When C$_2$ is /l/, C$_1$ must be one of plosives /p, p^h, k, k^h, b, g /. Six clusters of this type found in Geba are exemplified below.

m̥ìlɛ̀klɛ́	'forest'
ə̄p^{h}lò?	'seed'
dã̀?k^{h}lɛ́	'sugar cane'
dā̄glɔ̀œ̀?ə̄lɛ́	'red pepper'
plɛ́	'tongue'
blɛ̀?	'arrow'

(b) -r- cluster (C$_1$ r) pattern

When C$_2$ is /r/, C$_1$ must be one of voiceless velar /k, k^h/. The two clusters found are shown below.

dɛ̀wɛ̀dɛ̀krɔ̀?	'insect'
θɛ́kòk^{h}rɔ̀?	'to snore'

(c) -j- cluster (C$_1$ j) pattern

When C$_2$ is /j/, C$_1$ must be one of bilabial /p, m, b/. The, four clusters are shown below.

ə̄kámjì?	'tail'
bjàʃíp^{h}ò?	'child'
pjúʔà	'to boil something'

2.4 Vowel phonemes

There are nine vowels in Geba. There are no diphthongs in native Geba language, but a few diphthongs are found in Burmese borrowed words. Geba seems to have breathy vowels, but there is an unaccounted for regularity between vowel breathiness and the voicing of preceding consonants[2]. In this

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[2] This regularity can be captured by the rule in (i).

presentation, the collected data are transcribed as phonetically voiced and breathiness is ignored.

Table (8) shows the vowel phonemes in this Geba dialect.

	Front		Central	Back
	(unrounded)		(unrounded)	(rounded)
Close	i			u
		ɪ		
Close mid	e		ə	o
	ɛ			ɔ
Open			a	

Table 8 Geba Vowels

2.4.1 Co-occurrence Charts

Table (8) shows the distribution of consonant and vowel phones which are found with initial and medial elements.

(i) C__ C   / __   V
     | |
   [voiced]   [..]

Char.	-ɔ	-ə	-a	-e	-ɛ	-ɪ	-i	-o	-ʊ
p	1	4	4	2	4		1	2	
pʰ	2	1	4	4	1			15	3
t		16			1	1			
tʰ	2		12		2		16	9	1
k		3	8		3	1		10	3
ʔ	2	3	2	1	1		1		1
b	3	2	1	2	1	1	3	7	2
d	1	12	5	5	27	2	2	5	4
kʰ	9	3	12		6			13	3
g	1	9	8	1				1	3
m	6	1	3	6	12	1	18	2	16
n	5	1	4	4	3	2	10	4	4
r	1	1	3	1			1	4	2
θ	2	12	13	3	18		8	20	1
s	6	8	4	1	6		1	6	10
ʃ	2	1	1	3	2		8	2	2
sʰ	2		7	1	4		3	5	2
ʃʰ				2			2		
h	1		2		5			2	3
ʒ	1								
ɣ	1								
j	2	1	26	3	4	5		4	2
l	8	9	23	19	18		5	15	4
ɓ	1		13	1	5		2	6	5
ɗ	5		1	2	3		3	3	4
w			7	16	19		9	3	1

Table 9 Consonant and vowel co-occurrence chart

From Table (9), vowel /ɪ/ occurs with the consonants /t, k, b, d, m, n/ often in complementary distribution with /i/. This deserves further investigation. The consonant /ʃʰ/ occurs only with the vowels /ɛ, i/ in complementary distribution

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with /h/, and the consonants /ʒ/ and /ɣ/ are alike both occurring only with /ɔ/.

2.4.2 Vowel phonemes contrast

In the following example (10), phonetically similar segments are shown in analogous environments or minimal pairs.

10 (a) [i]-[e] *tʰínìɓù* 'ladle' *dɔ̄nès ɔ̄ɓɔ́* 'pestle' C.A.E
  (b) [i]-[ɛ] *tʰí* 'water' *tʰɛ́* 'gold' C.I.E
  (c) [ɪ]-[ɛ] *ʔɔ̀jī* 'to be far' *jɛ̀* 'to laugh' C.A.E
  (d) [e]-[ɪ] *tʃʰé* 'tiger' *ɔ̄tʃʰíkɛ̀ʔ* 'to be bad' C.A.E
  (e) [u]-[o] *kʰùʔ* 'to dig' *kʰòʔ* 'deer' C.I.E
  (f) [ə]-[o] *kʰàrəbɔ̀* 'shin' *rō* 'to choose' C.A.E
  (g) [ə]-[ɪ] *ɔ̄dɔ̄nà* 'to be straight' *dí* 'rice' C.A.E
  (i) [i]-[ɪ] *ɔ̄dí* 'to be thick' *dí* 'rice' C.A.E

2.4.3 Vowel description

There are nine vowels phonemes in Geba. Table (10) shows the nine vowel phonemes in Geba.

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segments	example in Geba	English
/i/	*ə̄bípʰò̰ʔ*	'to be short'
/ɪ/	*ʔɔ̀jī*	'to be far'
/e/	*dɔ̄nèsɔ̄ɓɔ́*	'pestle'
/o/	*ɔ̄θó*	'rotten'
/ɛ/	*tʰɛ́*	'gold'
/ɔ/	*sɔ̀pwé*	'to sneeze'
/a/	*θàʔ*	'to itch'
/u/	*sùθímìʔ*	'finger nail'
/ə/	*kʰàrə̄bɔ̀*	'shin'

Table 10 Vowel descriptions of Geba

2.5 Tones

Geba has three level tones: high, mid, low. All the tones can be attached to the glottal stop creating a new distinctive tone called a cut tone. One thing to note is that if the glottal stop appears in syllable initial position, it is a consonant; and, if it appears after the nucleus then it is a cut tone.

Table (11) shows the occurrence and the phonetic transcription of Geba tones.

	phonetic transcription	cut tones
mid	ˉ	ˉʔ
high	´	´ʔ
low	`	`ʔ

Table 11 Tones in Geba

The mid tones usually occur with the close mid central unrounded vowel *ə* and also appear in minor syllables. In (11) are some examples which show tone contrast in Geba.

(11) (a) high tone and low tone with cut tone
      kʰlí 'boat'   *kʰlḭ̀ʔ* 'turtle'
      (b) high tone and low tone.
      kʰlí 'boat'   *kʰlì* 'cross bow'
      (c) high tone and high tone with cut tone

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| *hó* | 'silver' | *hóʔ* | 'bamboo' |

(d) high cut tone and low cut tone

| *θóʔ* | 'tree' | *θòʔ* | 'louse' |

2.6 Conclusion

There are two types of syllables, major syllables and minor syllables, in Geba. Words occur with stress in different syllable position such as in the first syllable position in major syllable and the second syllable position if there is a minor syllable.

There are 34 consonants, including 5 rare consonant phonemes, found in this analysis. Twelve consonants co-occur with four consonants in consonant clusters.

There are nine vowels in Geba and no diphthongs are found except in borrowed Burmese words. There are three tones, mid, high, low, and the glottal stop can be attached to all three tones to form cut tones.