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A description of Tima Sounds

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Abstract

As is the case with many languages in the Sudan, the Tima language in the Nuba Mountains is considered to be highly endangered (Dimmendaal and Mugaddam 2005). This is because the language is no longer spoken by children, especially those who grow up in Khartoum state. Another reason for the endangerment is the multilingualism in the Tima area. Tima young people tend to use Arabic and English more often in their daily interaction outside the home domain. Dimmendaal & Voeltz (2007: 626) noted that “the Tima language is seriously endangered as a result of the encroaching role of Sudanese Arabic”. The present paper is a part of a documentation project has been conducted to stabilize the endangered situation of Tima. This documentation project is aiming at providing a description of the sound system, as well as the morphological structures of this language. In addition to this, a trilingual dictionary including Tima, Arabic, and English is also provided. Since the investigation of sounds represent the initial concern of a language description, this paper deals with the description of the sound system of Tima.
Introduction

This paper presents a description of Tima sounds: segmentals and suprasegmentals. The segmental sounds are consonants and vowels, where as suprasegmentals involve tone. The present description at the first hand deals with the description of the segmental sounds whereby articulatory features of consonant and vowels are first provided. Second, a description of the phonemic nature of the consonants and vowels is presented. This includes the identification of the consonantal and vocalic phonemes and their distributional patterning, followed by a description of syllable structure. Part two counts for the description of Tima tone whereby the types of tonal phonemes and their distributional patterns are also discussed.

1. Segmental sounds: Consonants

This section deals with the description of Tima consonants in terms of articulatory phonetics. That is, to describe the points of articulation for each sound.

Tima has 32 consonantal phones. They can be divided in terms of stricture types\(^1\) into two major classes of consonants: Obstruents, which include stops (voiceless and voiced), fricatives, and affricates, and sonorants which comprise nasals and approximants (liquids and glides).

1.1 Obstruents

In Tima, obstruents\(^2\) are mainly stops including plosives (voiceless and voiced) and implosives (voiced only) and they show up in different places of articulation, as shown in table (1). Fricatives are represented in bilabial, labiodental, dental, palatal and glottal points of articulation and an affricate show up only in the palatal position. The articulatory classification of Tima obstruents is shown in (1). Sounds are transcribed in IPA (revised 1993) symbols.

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\(^1\) One major property in the articulation of a consonant versus the articulation of a vowel is the degree of the stricture involved (Catford 2001: 60). In producing a sound the articulators can be formed in different closures such as being completely closed or as being far apart, and/or in approximate positions. Therefore, consonants are classified into two groups, sounds with an obstruction of the air flow and sounds which have no such obstruction. The former type is referred to as obstruent and the latter is known as sonorant.

\(^2\) Ladefoged (2001) classify obstruents into three groups: plosives, fricatives, and affricates. There are two crucial aspects characterizing the articulation of obstruents. First, obstruents are all oral, i.e. they are produced by closing the nasal tract so that the air cannot escape through the nose and instead passes through the oral tract. Second, obstruents involve a stricture in their production so that the resonance for them is reduced.
(1) Obstruents

Stops:

[p] voiceless bilabial plosive
[b] voiced bilabial plosive
[ɓ] voiced bilabial implosive
[t] voiceless dental plosive
[t] voiceless retroflex plosive
[tʰ] voiceless labialized retroflex plosive
[d] voiced alveolar implosive
[c] voiceless palatal plosive
[j] voiced palatal plosive
[k] voiceless velar plosive
[k] voiceless unreleased velar plosive
[kʰ] voiceless labialized velar plosive
[g] voiced velar plosive
[ʔ] voiceless glottal stop

Fricatives:

[ɸ] voiceless bilabial fricative
[f] voiceless labiodental fricative
[ð] voiced velarized dental fricative
[ʃ] voiceless palatal fricative
[h] voiceless glottal fricative
[hʰ] voiceless labialized glottal fricative

Affricates:

[tʃ] voiceless palatal affricate

1.2 Sonorants

Sonorant\(^1\) consonants are of two classes, as stated by Ladefoged: nasals and approximants. Nasals are formed by allowing the air to pass through the nasal tract. Tima has four places of articulations for nasals. These are bilabial, alveolar, palatal and velar. Approximants are those sounds which involve narrowing of the articulators for the airflow, but this narrowing is not sufficient to cause friction as is the case with fricatives. Approximant consonants in Tima are of different points of articulations: alveolar, retroflex (liquids), palatal, and velar (glides). The articulatory classification showing place and manner of articulations for each of the sonorant consonants is shown as in (2):

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\(^1\) Contrary to obstruents, sonorants are defined as those sounds which are produced with no stricture to prevent the airflow to cause voice in the vocal cords and resonance (Crystal 1991: 320).
(2) Sonorants

Nasals:

[m] voiced bilabial nasal
[n] voiced alveolar nasal
[n] voiced palatal nasal
[ŋ] voiced velar nasal
[ŋʷ] voiced labialized velar nasal

Liquids:

[l] voiced alveolar lateral
[r] voiced alveolar trill
[t] voiced retroflex tap or flap

Glides:

[j] voiced palatal glide
[y] rounded palatal glide
[u] voiced velar glide

The phonetic inventory of these sounds is shown in table 3.1.

<table>
<thead>
<tr>
<th></th>
<th>bilabial</th>
<th>labio-</th>
<th>dental</th>
<th>alveolar</th>
<th>retroflex</th>
<th>palatal</th>
<th>velar</th>
<th>glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosive</td>
<td>vl</td>
<td>p</td>
<td>ʃ</td>
<td>ʈ̚w</td>
<td>c</td>
<td>k, k, kʷ</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vd</td>
<td>b</td>
<td></td>
<td></td>
<td>j</td>
<td>g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implosives</td>
<td>b</td>
<td></td>
<td>d̃</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td>vl</td>
<td>ð</td>
<td>f</td>
<td>j</td>
<td>h, hʷ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vd</td>
<td></td>
<td>ð̆y</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Affricates</td>
<td>vl</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vd</td>
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<td></td>
</tr>
<tr>
<td>Nasals</td>
<td>m</td>
<td>n</td>
<td>ɳ</td>
<td>ɳ, ɳʷ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td>l</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Liquids</td>
<td>r</td>
<td>r</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>j, y</td>
<td>u</td>
</tr>
</tbody>
</table>

Table (1) Phonetic Inventory of Tima Consonants

1.3 Phonemic consonants

The distribution of Tima consonants is shown in the word patterns of nouns and verbs as indicated below from 3 to 8. Both obstruents and sonorants are shown in the initial, medial and final word positions. The gaps are indicated by dashes '---'. Examples of words with each of the consonants are given below from (3) to (8). Examples are organized according to the places of articulation for each class of sounds. In the first group of each example the consonant is in word-initial position. In the second group the consonant is in word-medial, or mostly intervocalic position. In the last group the consonant is in word-final position. Gaps indicate that there is no example in the data.
### Obstruent stops

<table>
<thead>
<tr>
<th>Plosives</th>
<th>Initially</th>
<th>Gloss</th>
<th>Medially</th>
<th>Gloss</th>
<th>Finally</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[p]</td>
<td>[pɑ̞ʊŋ]</td>
<td>'grandfather'</td>
<td>[kʃɪn]</td>
<td>'bladder'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>[bɑ̞ːkʊŋ]</td>
<td>'leopard'</td>
<td>[kʊbʊŋ]</td>
<td>'ivory'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[t]</td>
<td>[tʊ]</td>
<td>'uproot'</td>
<td>[kʰʃɪ]</td>
<td>'guinea fowl'</td>
<td>[pɑ̞ːŋ]</td>
<td>'lung'</td>
</tr>
<tr>
<td>[l]</td>
<td>[tʊnək]</td>
<td>'sing'</td>
<td>kʊːtʊnʊl</td>
<td>'returning back'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[ɛɾ]</td>
<td>[tʰɔ́tʰɔ́k]</td>
<td>'water pot'</td>
<td>[tʰɔ́tʰɔ́k]</td>
<td>'wood pecker'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[c]</td>
<td>[cɛh]</td>
<td>'sorghum'</td>
<td>[kʰɛmɓɑ́ɾ]</td>
<td>'child'</td>
<td>[ɑ̞ːkɪkɪc]</td>
<td>'naughty'</td>
</tr>
<tr>
<td>[t̚]</td>
<td>[t̚ɛɾɪ]</td>
<td>'bird' sp</td>
<td>[t̚ɛɾɪ]</td>
<td>'filter'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[k]</td>
<td>[kɑ́]</td>
<td>'head'</td>
<td>[kɪlɑ́kɔ́yʊŋ]</td>
<td>'bird'sp'</td>
<td>[kʊʊmʊk]</td>
<td>'billy goat'</td>
</tr>
<tr>
<td>[kʰ]</td>
<td>[kʰɛɾ]</td>
<td>'walking'</td>
<td>[kʰɛɾɛɾʊŋ]</td>
<td>'old/big'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[k̚]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[ɑ́ːt̚ɑ́mʊk]</td>
<td>'get someone out'</td>
</tr>
<tr>
<td>[ɣ]</td>
<td>[ɡɪt̚]</td>
<td></td>
<td></td>
<td></td>
<td>'all'</td>
<td>-------</td>
</tr>
<tr>
<td>[ʔ]</td>
<td>[ʔɑ́mɑ́m]</td>
<td></td>
<td>[ɑ̞ːɾɛɾʊ]</td>
<td>'is bad'</td>
<td>[kʊjɑ́t̚ɑ̞ːʔ]</td>
<td>'kujatáʔ'</td>
</tr>
</tbody>
</table>

### Implosives

<table>
<thead>
<tr>
<th>Plosives</th>
<th>Initially</th>
<th>Gloss</th>
<th>Medially</th>
<th>Gloss</th>
<th>Finally</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ɓ]</td>
<td>[bʊlʊkʊk]</td>
<td>'rubbish hole'</td>
<td>[kɑ́bʊh]</td>
<td>'meat'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[ɗ]</td>
<td>[ɗɑ́lɑ́]</td>
<td>'roof of the house'</td>
<td>[kɪdɪ]</td>
<td>'1sg'</td>
<td>--------</td>
<td>-------</td>
</tr>
</tbody>
</table>

### Obstruent fricatives

<table>
<thead>
<tr>
<th>Fricatives</th>
<th>Initially</th>
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<th>Medially</th>
<th>Gloss</th>
<th>Finally</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[φ]</td>
<td>[fɪɾɪfɪt]</td>
<td>rhinoceros</td>
<td>[jɑ̞ːlɪfɪn̚a]</td>
<td>'fragrance'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[f]</td>
<td>[fɪɾɪfɪ]</td>
<td>rhinoceros</td>
<td>[jɑ̞ːlɪfɪp̚a]</td>
<td>'fragrance'</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[ð]</td>
<td>[d̚ɑ̞ːɾɪ]</td>
<td>'saliva'</td>
<td>[kɑ̞ːd̚ɑ̞ːɾɪ]</td>
<td>'heart'</td>
<td>[kɪmɑ́mʊd̚ʊ]</td>
<td>'nose'</td>
</tr>
<tr>
<td>[ɹ]</td>
<td>[ʃɪd̚ɑ̞ːk]</td>
<td>'chin'</td>
<td></td>
<td></td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>[h]</td>
<td>[hɑ́lɑ́k]</td>
<td>'stop'</td>
<td>[kɛʁlɛlɛɾ]</td>
<td>'bird sp'</td>
<td>[ɑ̞ːmʊh]</td>
<td>'leave'</td>
</tr>
<tr>
<td>[hʰ]</td>
<td>[h̚ɪɾu̞ːɡ̚]</td>
<td>'three'</td>
<td></td>
<td></td>
<td>--------</td>
<td>-------</td>
</tr>
</tbody>
</table>

### Sonorants

<table>
<thead>
<tr>
<th>Sonorants</th>
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<th>Gloss</th>
<th>Medially</th>
<th>Gloss</th>
<th>Finally</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[m]</td>
<td>[mɑ̞ːn̚ɪkʊŋ]</td>
<td>'root of plant'</td>
<td>[kʊɾmɑ̞ːk]</td>
<td>'cut'</td>
<td>[ɑ̞ːlɑ̞ːm]</td>
<td>'bite'</td>
</tr>
<tr>
<td>[n]</td>
<td>[nɛ̚ːhɪ]</td>
<td>'on the ground'</td>
<td>[p̚ɑ́m̚]</td>
<td>'be quite'</td>
<td>[kʊm̚ɑ̞ːŋ]</td>
<td>'dandru'</td>
</tr>
<tr>
<td>[n̚]</td>
<td>[nɪhɪn̚]</td>
<td>3pl.ERG</td>
<td>[kɪmɑ̞ːn̚ɪk]</td>
<td>'liver'</td>
<td>[bʊɾ̚ɑ̞ːŋ]</td>
<td>handle of a knife</td>
</tr>
<tr>
<td>[ŋ]</td>
<td>[ŋɑ̞ːŋ]</td>
<td>2sg</td>
<td>[ŋɑ̞ːɾɪŋ]</td>
<td>sister's children</td>
<td>kʊm̚ɑ̞ːŋ</td>
<td>'fish'</td>
</tr>
<tr>
<td>[ŋʰ]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>kʊŋ̚ˈɑ̞ːr̚ɑ̞ːk</td>
<td>'crow'</td>
</tr>
</tbody>
</table>

### Liquids

<table>
<thead>
<tr>
<th>Liquids</th>
<th>Initially</th>
<th>Gloss</th>
<th>Medially</th>
<th>Gloss</th>
<th>Finally</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[l]</td>
<td>[lɑ̞ːl]</td>
<td>'sneak'</td>
<td>[kʊlʊŋ]</td>
<td>'tigh'</td>
<td>[t̚o̞ːl]</td>
<td>'clean'</td>
</tr>
<tr>
<td>[ɾ]</td>
<td>[ɾɑ̞ːŋkɑ́l]</td>
<td>'crawl'</td>
<td>[u̞ːɾɑ̞ːɾɔ̞ːmɑ̞ːd̚ɑ̞ːh]</td>
<td>'man'</td>
<td>[mʊ̞ːɾ]</td>
<td>'pick up'</td>
</tr>
<tr>
<td>[t]</td>
<td>[t̚ɪŋkɪk]</td>
<td>'beer'</td>
<td>[kɑ̞ːt̚ɑ̞ːɾʊ]</td>
<td>'cleaning the farm'</td>
<td>[t̚ɔ́ɾ]</td>
<td>'pour'</td>
</tr>
</tbody>
</table>

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Glides

<table>
<thead>
<tr>
<th></th>
<th>Initially</th>
<th>Gloss</th>
<th>Medially</th>
<th>Gloss</th>
<th>Finally</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[j]</td>
<td>[jáám]</td>
<td>'hair'</td>
<td>[kájil]</td>
<td>'breast'</td>
<td>[kútē]</td>
<td>'guinea fowl'</td>
</tr>
<tr>
<td>[v]</td>
<td>[vúrāj]</td>
<td>'sticks'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[u]</td>
<td>[uqēën]</td>
<td>'mother'</td>
<td>[kúdōuqāk]</td>
<td>'marry'</td>
<td>[kāuj]</td>
<td>'waist'</td>
</tr>
</tbody>
</table>

From the above distribution it is clear that most Tima consonants have contrastive oppositions in the relevant word positions. However, as indicated by the dashes, the opposition is lacking for some consonants. This is due to cases where the occurrence of some consonants is restricted to certain environments and, or, defective distribution where the contrast is lacking between two consonants in a certain environment, simply because none of them shows up in that environment. There is no evidence for neutralization in Tima. Also, there are cases of free variation where two, or more, sounds are freely occurring in the same environment. Further evidence for the phonemic status of Tima consonants is the classical criterion of minimal contrast. A list of near minimal pairs for Tima consonants is shown in (3). Identical minimal pairs are much more common among verbs than among nouns.

(3)

/p/  /piítā/ 'stool'  /b/  /biṭi/ 'shortness'
/b/  /kúbōŋ/ 'ivory'  /b/  /kábōŋ/ 'horn'
/t/  /túh/ 'uproot'  /t/  /túh/ 'hang' v
/l/  /lōuqā/ 'throw'  /d/  /dōuqā/ 'get down'
/c/  /cojuuqā/ 'kind of tree'  /j/  /juuqāj/ 'sand'
/c/  /ciꫀqā/ 'chin'  /k/  /kōdā/ '1sg'
/k/  /kìh/ 'sugar cane'  /g/  /giŋ/ 'all'
/k/  /ámōk/ 'wash someone'  /h/  /ámēh/ 'leave'
/m/  /t̪imāk/ 'wrestle'  /n/  /t̪ūnāk/ 'sing'
/n/  /t̪ōn̪/ 'return'  /ŋ/  /d̪ēŋ̪/ 'get up'
/n/  /t̪ōn̪/ 'repeat'  /l/  /t̪ōl̪/ 'clean' imp
/n/  /t̪ūn̪ūk/ 'put together'  /d̪/  /t̪ūd̪ūk/ 'open' imp plur
/t/  /kōˈũːŋ/ 'smoke'  /t/  /kūˈũːn/ 'belly'
/t̪/  /c̪̪̪r̪ ŋ̪/ 'throat'  /l/  /t̪ōl̪/ 'reconcile'
/l/  /ku�.OnClickListener("k̪̪̪l̪/ 'year'  /d/  /k̪̪̪l̪/ 'crying'
/j/  /pó̪̪̪j̪/ 'shoot' 'imp'  /l/  /p̪̪̪l̪/ 'blow'
/ʊ̪̪̪/  /ʊ̪̪̪e̪̪̪ŋ̪/ 'mother'  /c/  /c̪̪̪e̪̪̪n̪/ 'face
The inventory of consonant phonemes is illustrated in the following table\(^1\).

<table>
<thead>
<tr>
<th></th>
<th>bilabial</th>
<th>dental</th>
<th>alveolar</th>
<th>retroflex</th>
<th>palatal</th>
<th>velar</th>
<th>glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosive</td>
<td>vl</td>
<td>p</td>
<td>ʰ</td>
<td>t</td>
<td>c</td>
<td>k</td>
<td>ʔ</td>
</tr>
<tr>
<td></td>
<td>vd</td>
<td>b</td>
<td></td>
<td>j</td>
<td>g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implosives</td>
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<td></td>
<td>dʰ</td>
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<td></td>
<td></td>
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<tr>
<td>Fricatives</td>
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<td></td>
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<td>h</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vd</td>
<td>ʋ</td>
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</tr>
<tr>
<td>Nasals</td>
<td>m</td>
<td>n</td>
<td></td>
<td>n</td>
<td>ɳ</td>
<td>ɲ</td>
<td></td>
</tr>
<tr>
<td>Lateral</td>
<td></td>
<td></td>
<td>ɬ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquids</td>
<td></td>
<td>r</td>
<td>ɾ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glides</td>
<td></td>
<td></td>
<td></td>
<td>y</td>
<td>w</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (2) The inventory of Tima consonant phonemes

When we compare the inventory of Tima consonants in (2) with inventories of other Kordofanian languages such as the closest relative Katla (Tucker and Bryan 1966) and Lumun (Spork 2004), we find that the Tima consonant inventory lacks the class of doubly articulated consonants; namely, labiovelar [kp, gb]. This class of sounds distinguishes African languages from many other languages of the world, and they are particularly very common in the Niger-Congo language family. Tima, however, has the common implosive stops [ɓ] and [ɗ]. The implosive [ɓ] contrasts with its non-implosive counterpart [b]; so, both are judged to be phonemes. The Tima language does not have the universally unmarked fricative /s/, but it has /h/ which probably, as suggested by Dimmendaal (2009a), is a result of a historical shift \(*s > h.\)

1.4 Allophonic relations of Tima consonants

The allophonic retaliations between Tima consonants are manifested in two types of variable sounds. Conditioned variants (allophones) appear as a result of complementary distribution, and free variants which are shown up freely without conditions.

1.4.1 Conditioned allophones

[y] and [y]

In Tima, the sounds [y] and [y] alternate allophonically in a morphophonemic context. This type of allophony is rather complex, because it affects

\(^1\) Up to this point the palatal and the labial glides are represented, in the phonetic and phonemic representation, as \([j] /j/\), \([u] /u/\) respectively, for a practical reason however they will be represented in the rest of the article as \(y\) and \(w\) respectively.
the morpho-phoneme \{i\}. This \{i\} is considered as a morpho-phoneme in Timna because it shows up in different allophones as a result of a morphological context and functions as an allomorph (for plural) as well (Bashir 2010: 131). Before a noun root, \[y\] alternates according to the following vowel, i.e. it is un-rounded \[y\] before non-high /a, ʌ, ə, ø, o/, whereas it is rounded \[y\] before a high rounded /u, u/. This means that \[y\] and \[y\] are in complementary distribution and both are allophones of the morph-phoneme \{i\}. The examples in (4) illustrate the distribution.

(4)

/\[y\]/ before /a, ʌ, ə, o/ > \[y\]

a. /yərəŋ/ \[yərəŋ\] 'leopards'
b. /yəkɪdək/ \[yəkɪdək\] 'stools'
c. /yöyöh/ \[yöyöh\] 'grasses'
d. /yərɪləŋ/ \[yərɪləŋ\] 'chameleons'

/\[y\]/ before /u, u/ > \[y\]

a. /yərəŋ/ \[yərəŋ\] 'sticks'
b. /yəɾəŋkʊ/ \[yəɾəŋkʊ\] 'earrings'

[k], [k\*]

The sound [k] changes phonetically when it occurs word-initially or medially before certain vowels. The change involves labializing of [k] before the non-high rounded vowel [o, ɔ], whereas it is not labialized before the rest of the vowels.

(5)

Labialized [k\*] Non-labialized [k]

a. [k\*ːɔhɬʊl] 'weeding' [kɔcimɔl] 'meeting'
b. [k\*ːɔrɪləŋ] 'chameleon' [kɪrɪlɪk] 'pond'
c. [kʊk\*ːɔlʊŋ] 'old' [kəmbɔlə] 'camel'
d. [k\*ːɔnʊ] 'ear' [kɔtə] 'take' plur

---

1 The term ‘morpho-phoneme’ is defined by Crystal (1991) as “the basic unit recognized in a morphophonemic level of analysis”. It is introduced by post-Bloomfieldian structuralists to set up a further level intermediate between phonemes and morphemes. Some morpho-phonemes have indirect relation to the phonemes they realized and therefore they alternate (Spencer 1991).
From (11) it has been noticed that the labialized [kʷ] has a restricted position in that it only occurs before [o, ɔ]. Thus, it is an allophone of its non-labialized counterpart.

Also, [k] and other obstruents have been attested as being labialized before the glide /w/. This means that the glide /w/ has the same phonetic effect of rounding on obstruents as the rounded vowels /o, ɔ/ “lip rounding is an essential part of /w/ therefore obstruents are slightly rounded when they occur in clusters in which /w/ is the second element” (Ladefoged, 1982: 157). See the examples in (6):

(6)

a. [tʰwáárè] 'outs ide'
b. [kôn̥wáärók] 'crow'
c. [hʷwááy] 'rope'

Since it has been proved that labialization in Tima is resulting from a phonetic rather than a phonemic context, it should not be represented in the phonemic writing of the language.

1.4.2 Free allophones

[k], [k̩]

One case of free variation in Tima occurs when the sound [k] shows up in the end of a word where speakers pronounce it as released [k] and sometimes as unreleased [k̩]. See the examples in (7):

(7)

a. [húndůuk] [húndůük] 'hop on one leg' imp
b. [kúkwaák] [kúkwaák] 'chicken'
c. [kwíčk] [kwíčk] 'type of fruit'
d. [káwrók] [káwrók] 'turtle dove'

Because speakers of Tima are free to vary between the sound [k] and the sound [k̩] word-finally, we can say that the two allophones of the same phoneme /k/ are in free variation in that position. The situation of not releasing [k] in word-final position may also be analyzed phonologically as a weakening process which this consonant in Tima undergoes (Bashir 2010: 151)

[p], [f] and [φ]

The voiceless bilabial stop /p/ is a phoneme in Tima, but it replaces [f] in Arabic loan words. In Arabic loan words, the Arabic phoneme /f/ is actually

---

1 For example, [kʷɔ́ɔt̚l] ‘weeding’ and [kʷɔ́nɔ́] ‘ear’ are written phonemically /kʰt̚l/ and /kʰnɔ́/ respectively.
replaced by three free variants from Tima. Some speakers tend to pronounce it
as a voiceless labiodental fricative [f], but most speakers tend to use both the
voiceless bilabial plosive [p] and the voiceless bilabial fricative [φ]. See the
examples in (8):

(8) Arabic
   Tima
   a. [liiifa]            [lìppà], [lìffà]               'swam'
   b. [fìrтği]            [fìrтğî], [pìrтğî], [φìrтğî]  'rhinoceros'
   c. [yalfìñna]          [yàlfìñnà], [yàlpìñnà], [yàlfìñnà]  'fragrance'

[c], [ʃ] and [tʃ]

In many words in Tima, the voiceless palatal stop [c], which is a phoneme
in the language, is sometimes pronounced as a post-alveolar fricative [ʃ], and/or
as an affricate [tʃ] allophone. The variation of the pronunciation for [c] is due to
a social rather than a phonological reason, since the variation between the three
phones is conditioned by the dialect of the speaker. Therefore, the variation is
somehow restricted; “there are two ways in which free variation can be
restricted. For one thing, variation between one allophone and another may be
conditioned, but by social factor rather than phonological factors” (Crowley et
al 1995: 92). The variant [ʃ] is mostly used by the speakers from Balool village,
whereas speakers of other villages tend to use [c] and [tʃ], as shown in the
examples in (9)

(9) Balool speakers                  Other Tima speakers
    [ʃìdàk]                        [cìdàk], [tʃìdàk]     'chin'
    [ʃìdík]                        [cìdík], [tʃìdík]     'beans'
    [ʃììn]                         [cììn], [tʃììn]        'coldness'

1.5 The archaic velarized dental fricative /ðɬ/

Another case of restricted free variation in Tima is the one between the
velarized dental fricative [ðɬ] and the palatal glide [y]. This variation is also
restricted because of a social factor which, in this case, is the age of the speaker;
i.e. [ðɬ] is only occurring in the speech of very old people whereas [y] is used by
younger speakers. In this respect, [ðɬ] is considered as an archaic sound which
was used as a phoneme in the past but synchronically it has shifted to the palatal
glide /y/ in all word positions following a short vowel. See the examples in (10):

(10) Old Speakers                  Younger Speakers
    a. [dàðøi] > [yàyi]           'saliva'
    b. [wàðøn] > [wàjên]         'mother'
c. [k̪ōd̪j̪on] > [k̪ōd̪j̪yon] 'heart'
d. [cīlēθ] [cīlēy] 'tooth'

However, in word-final position following long vowel the glide [y] disappears in the speech of younger speakers and consequently free variation doesn’t exist. This is illustrated in the following examples.

(11)
a. [cīið] [cīi] ‘eye’
b. [k̪id̪ið] [k̪id̪i] ‘leg’
c. [kimāmīð] [kimāmī] ‘nose’

The disappearing of the [y] after a long vowel, namely [ii] probably results from the similar phonetic nature of the vowel [i] and the palatal glide [y]. Dimmendaal (2009b) also noticed the above described variation between old and young generation and mentioned that it is the most distinctive property occurring in the speech of the oldest speakers in the community and separating them from younger speakers, but he instead analysed our velarized dental fricative [ð] as a velarized lateral [l].

Having described the relation between Tima consonant phones, we can now conclude that Tima has a total number of 22 consonant phonemes and 10 allophones varying between conditioned variants and free variants.

1.6 Distribution and phonotactics of Tima consonants

1.6.1 Distribution

Now we turn to the possible distributions and occurrences of Tima consonants. The inventory of Tima consonant phonemes as shown earlier is divided into two major classes: the class of obstruents (obst) and the class of sonorants (son). Obstruents and sonorants have a different distribution within word positions (initial, medial and final), as will be shown in table (3).

<table>
<thead>
<tr>
<th>obst</th>
<th>initial</th>
<th>medial</th>
<th>final</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>t̪</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>c</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>j</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>k</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>g</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>?</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>b̪</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>d̪</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>h</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>son</th>
<th>initial</th>
<th>medial</th>
<th>final</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>n</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>n̪</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>n̪̪</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>l</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>r</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>r̪</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>y</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>w</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Table (3) Distribution of Tima Consonant Phonemes
Table (3) reveals that there is a systematic gap in the distribution of obstruents stops in word-final position resulting from a defective distribution for obstruents in that position. As for /t̚, c, k/, which appear in the table occurring in word final position, /t̚, c/ have been attested in that position only in a few words, as shown in the examples above in (4), and /k/ also is freely replaced by an unreleased variant which, in terms of phonetic realization, is not clear (not audible) and may be in the process of being lost in that position. This of course proves that stops (except for /ʔ/) in Tima simply are not preferable in word-final position.

In Tima, as it has been observed, the glottal stop is a regular phoneme in word-medial position, but in initial and final positions it indicates the boundary of an isolated word where there is no consonant present.¹

The consonant /g/ does not occur frequently in the language and only shows up in a few words in the data.

As for fricatives, the fricative /h/ has a full distribution since it appears in all word positions. With regard to sonorants, it is apparent from the table that all Tima sonorants have a full distribution in all word positions.

1.6.2 Phonotactics

Phonotactics as defined by Crystal (1996) and also Ashby and Maidment (2005) is a term used to refer to the 'tactic behavior' of the phonological units, especially the sequential arrangements.

In our description of Tima phonotactics of the permissible strings of consonant phonemes we will follow the classification made by Catford (2001) for the types of consonant sequences. He classifies consonant sequences into homo-organic and hetero-organic sequences. First, we describe homo-organic sequences and second, we account for hetero-organic sequences.

1.6.2.1 Homo-organic sequences: Geminates

Homo-organic (or homorganic) consonantal sequences are those sequences that are formed by the same articulators; they are found in Tima in two types: geminates and the sequence nasal plus stop. We begin with geminate consonants; next, we turn to the sequence nasal plus stop.

The word 'geminate' comes from Latin to mean 'twin'. It is used in phonology to refer to a sequence of identical consonantal sounds (Catford 2001).

¹Ladefoged & Maddieson (1995: 74) distinguished between different types of glottal stops found in the world's languages. In one type, as they noted, the glottal stop is part of the regular stop series, in another it serves to demarcate the boundaries of phrases or other prosodic units such as in German, where the glottal stop indicates the beginning of a word when no other consonant is present. Accordingly, in the phonemic writing of Tima language, the glottal stop will not appear in the initial and final word positions.
Languages are divided in terms of the type of a geminate they permit into two types: languages which permit true geminates, such as Arabic where the sequence of [mm] and [ll] in [hammam] 'bathroom' and [ʔallah] 'God' is a true geminate because it occurs within one and the same word. Other languages allow a type of fake geminate as [nn] in the English word 'unknown'. This geminate is not an inherent part of the word but is found as a result of combining two morphemes, i.e. 'un-' plus 'known'. 'True geminates' and 'fake geminates' are also referred to in the literature as 'fortis geminates' and 'lenis geminates', respectively.

Geminates in Tima are fake, because they occur across morpheme or even word boundaries. This would suggest that they are formed as a result of word formation processes, as shown in the following reduplicated forms:

(12)

a. ká.pák-ká.pák > ká.pák-ká.pák 'kind of plant'
b. kúúrá kó.dók-kó.dók > kúúrá kó.dók-kó.dók 'the round ball'
c. tók-tók > tók-tók 'usually'

Both [kk] in (12a) and [tt] in (12b) are sequences of articulations formed by the same articulators, however, the sequence in (12c) occurs as a result of a phonotactic constraint, i.e. to avoid the sequence of two different obstruents. Geminates may also occur as a result of assimilation (Bashir 2010: 135)

Geminates in Tima are commonly associated with expressing intensification. This commonly appears in the formation of a predicative adjective where the predicate prefix ‘à-’ is attached to a consonant initial adjectival root. The following geminates have been attested across morpheme boundary in intensifying adjectival predicates. The dots indicate syllable boundaries and the hyphens indicate morpheme boundaries, this convention will be applied all through the present description.

(13)

-p- à-pán '3sg is large' -pp- à-ppán '3sg is very large'
-m- à-mál '3sg is good' -mm- à-mmá '3sg is very good'
-t- à-tí '3sg is short' -tt- à-ttí '3sg is very short'
-t- à-tón '3sg is dirty' -tt- à-ttón '3sg is very dirty'
-d- à-dón '3sg is long' -dd- à-ddón '3sg is very long'
-k- à-kák '3sg is bitter' -kk- à-kkák '3sg is very bitter'
-h- à-héh 'is bitter' -hh- à-hhéh '3sg is very green'
-l- à-líl 'is cold' -ll- à-llíl '3sg is very cold'
-r- à-rdí 'is red' -rr- à-rrdí '3sg is very red'
In some adjective with a disyllabic root, the geminated consonant occurs in the last consonant of the first syllable of the root, as shown in (21):

(14)
\[-][a-\text{rɪt} \text{.tik}]
\text{‘3sg is fat’}
\[\text{-}[\text{a-}\text{rɪt} \text{.tik}]
\text{‘3sg is very fat’}
\[-][\text{a-}\text{rɔ} \text{.o} \text{r}]
\text{‘3sg is bad’}
\[\text{-}[\text{a-}\text{rɔ} \text{.o} \text{r}]
\text{‘3sg is very bad’}

The phenomenon of an intensifying form of the adjective is also found in some Nilo-Saharan languages in the Nuba Mountains like These (Yip 2004:104), as shown in the following examples:

(15)
a. \[-][\text{1} \text{-}]
\text{‘esákálá} \text{‘long’} \[-][\text{ll} \text{-} \text{ésákállá}]
\text{‘very long’}
b. \[-][\text{r} \text{-}]
\text{‘nàrè} \text{‘strong’} \[\text{rr} \text{-} \text{nàrrè}]
\text{‘very strong’}

There is a restriction with respect to the glides in Tima, which do not occur as geminates. Consider the following example for /y/.(16)

a. \[\text{à-yáádà} \text{‘3sg is new’} \quad \text{à-yáádà} \text{‘3sg is very new’}
*b. \[\text{à-yyáádà} \text{‘3sg is new’} \quad \text{à-yyáádà} \text{‘3sg is very new’}

The glide /w/ also has never been attested as a geminate in the data.

1.6.2.2 Nasal plus stop

The sequence nasal plus stop across syllable and morpheme boundaries is attested in Tima. The nasal tends to assimilate to the place of articulation of the following stop. Table (4) illustrates examples of such combinations within words.

<table>
<thead>
<tr>
<th>Nasal + stop across syllable boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>m.b</td>
</tr>
<tr>
<td>n.d</td>
</tr>
<tr>
<td>p.c</td>
</tr>
<tr>
<td>n.k</td>
</tr>
<tr>
<td>kl-hám.bà</td>
</tr>
<tr>
<td>NC.sg-peel of sugar cane</td>
</tr>
<tr>
<td>'peel of sugarcane'</td>
</tr>
<tr>
<td>tón.do</td>
</tr>
<tr>
<td>NC.sg-roa</td>
</tr>
<tr>
<td>'road'</td>
</tr>
<tr>
<td>ká.kúp.cèe</td>
</tr>
<tr>
<td>NC.sg-door</td>
</tr>
<tr>
<td>'door'</td>
</tr>
<tr>
<td>rán.kàl</td>
</tr>
<tr>
<td>'crawl'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nasal + stop across morpheme boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>m.p</td>
</tr>
<tr>
<td>n.t</td>
</tr>
<tr>
<td>p.c</td>
</tr>
<tr>
<td>n.k</td>
</tr>
<tr>
<td>cém-póül-dà cinji</td>
</tr>
<tr>
<td>PROG.1sg-blowing-1sg-fire</td>
</tr>
<tr>
<td>'I am blowing at the fire'</td>
</tr>
<tr>
<td>cén-ți.hí-dà</td>
</tr>
<tr>
<td>PROG.1sg-uprooting-1sg</td>
</tr>
<tr>
<td>'I am uprooting'</td>
</tr>
<tr>
<td>ká.kúp.cèe</td>
</tr>
<tr>
<td>NC.sg-door</td>
</tr>
<tr>
<td>'door'</td>
</tr>
<tr>
<td>cęną-kálààk-i-dà</td>
</tr>
<tr>
<td>PROG-eat-1sg</td>
</tr>
<tr>
<td>'I am eating'</td>
</tr>
</tbody>
</table>

Table (4) the sequence nasal+stop across syllable and morpheme boundary

1.6.2.3 Hetero-organic sequences: Liquid plus stop

A hetero-organic sequence is one on which the articulators used in the successive sounds are quite different, which means that they can be freely independent from each other. For instance, in English, the sequence [kd] in 'back
door' is a hetero-organic sequence, because the tongue can move freely from the dorso-velar position for [k] to the alveolar ridge where [d] is independently articulated.

In Tima, a hetero-organic sequence can be found word-medially across syllable boundaries. Hetero-organic sequences are attested in the following combinations:

Most Tima CC sequencees across syllable boundaries consists of a liquid, either lateral /l/ or /ɾ/ as C₁, followed by a stop obstruent as C₂. Consider the following examples:

(17)

r/l+ stop

a. kár.báá.bôn 'spider' f. kir.kí 'lie'
b. wór.tô 'male' g. kól.bá 'well'
c. kúr.tú 'house' i. ki.tél.tél 'water making waves'
d. ãr.dí 'is red' j. túl.kùù 'water bag'
e. jór.jór 'filter'

1.6.2.4 Liquid plus nasal

A sequence of liquid plus nasal is also common in Tima. See the examples:

(18)

r/l+nasal

a. ãr.ŋél 'is confused'
b. kól.ná 'feast'
c. kil.ŋá 'tree stump'

A sequence of liquid plus the glide /w/ is attested in few examples like ‘púrwa’ 'sweat'

A combination of a glide /w/ or /y/ followed by a liquid is also possible but rare.

(19)

a. kàw.rók 'turtle dove'
b. kày.rá 'gate'

A sequence of two liquids across syllable boundary is attested so far in one example. However, a sequence of two glides is not permissible.

(20)

kwàá.r.lsl 'coughing'

1.6.2.5 Consonant cluster
According to Crystal (1996), a cluster is a term used to refer to any sequence of adjacent consonants occurring initially or finally in a syllable. In Tima, consonant clusters are frequently found syllable initially with a special class of nouns. They usually appear as the sequence kw in the beginning of many nouns. The first member of the cluster k represents the noun class prefix for singular while the second member w is the root initial consonant of the noun. Consider the following examples.

(21)

a. k-wâán 'brother'
b. k-wéëŋ 'pot'
c. k-wâlà 'rope'

The sequence obstruent + w is also attested in words other than nouns, but they are few in number.

(22)

a. twá.ri 'outside'
b. hwáál 'watch' imp
d. i-hwááy 'three'

In our discussion of consonant sequences so far, we looked at the restrictions on Tima C₁C₂ as a restriction which is generally resulting from the combination of sonorant + obstruent, or obstruent + sonorant, or obstruent + obstruent, and or sonorant + sonorant. Table (5) summarizes the permissible combinations of C₁C₂ members.

<table>
<thead>
<tr>
<th>Homorganic sequences</th>
<th>C₁C₂ Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geminates</td>
<td>obst+obst</td>
</tr>
<tr>
<td></td>
<td>son+son</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>other Homorganic sequence</td>
<td>son+obst</td>
</tr>
<tr>
<td>Heterorganic sequence</td>
<td>son+obst</td>
</tr>
<tr>
<td></td>
<td>son+son</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Consonant cluster</td>
<td>obst+son</td>
</tr>
</tbody>
</table>

Table (5) Permissible combination of CC sequence in Tim

2. Segmental sounds: Vowels

Principally, vowels are distinguished in terms of quality and quantity. Quality is the precise combinations of tongue movements which are determined
by the position of the tongue and lips. Quantity revolves around the question how long the sound lasts (Spencer, 1996). Following this principle we attempt to describe Tima vowels. First, we distinguish the vowels in terms of tongue height, frontness/backness and lip rounding.

2.1 Tima high and non-high vowels

The height of a vowel refers to the relationship between the highest point of the tongue and the roof of the oral cavity. In this respect, Tima vowels constitute three classes: the class of high vowels which are produced when the tongue is raised so as to be very close to the roof of the mouth. These vowels are: [i, ɨ, ɪ, ɯ, u]¹. The class of low vowels are produced when the tongue is lowered (sets in its neutral position), so that there is a wide gap between its highest point in the roof of the mouth and the lowest point in its neutral position. The types of such vowels are [ɑ, ɑ]. Finally, is the class of mid vowels which is represented by the vowels [ɛ, ɨ, ə, ə]. These vowels are articulated with the tongue positioned between high and low points of articulations.

2.2 Tima front, central and back vowels

It may be useful for many languages to describe their vowels with regard to the front/back dimension. However, this dimension is not sufficient in the description of Tima vowels, because the language also has central vowels. The issue of central vowels is rather controversial for the reason that a central vowel in some languages behaves either as though it were a back or front vowel, so the simple front/back dimension suffices to describe their vowels. In Tima the case is different, since central vowels behave independently from front and back vowels; therefore, in our description the central vowels are distinguished from front and back vowels because they are neither front nor back. The Tima front vowels are [i, ɨ, ɛ, ɛ], the central vowels are [i, ɨ, ə, ə] and the back vowels are [u, ɯ, ə, ə].

2.3 Tima rounded and non-rounded vowels

Rounded vowels are produced by protrusion of the lips. Unrounded vowels have a spread or neutral lip position. Lip rounding is applied not only to vowels, but also to consonants, such as labio-velar [w] and labialized consonants [pʷ, tʷ, kʷ, ...] (Durand, 1990).

In Tima, only back vowels involve lip rounding in their production. In this respect, the front, central and back vowels are divided into two classes; the class of unrounded non-back vowels which includes front and central vowels [i, ɨ, ɛ, ɛ,

¹ The diacritic under these vowels is an IPA convention to indicate the advancement of the tongue root [ATR] feature. When the vowel is produced with advancement of the tongue root, the small horizontal line of the diacritic goes leftwards e.g. ɨ and when the vowel is pronounced without tongue advancement, the horizontal line of the diacritic goes to the right, e.g. ʉ.
and the class of rounded vowels which continues the back vowels [u, y, o, ø]. The labiovelar glide in Tima also involves lip rounding. This rounding has its effect on the preceding sounds and makes them round (Bashir 2010:59)

### 2.4 Advancement of tongue root [ATR]

Another articulatory dimension added to the description of vowels is the advancement of the tongue root. This feature is of a considerable interest since it is used in a great many African languages (largely restricted to Niger Congo and Nilotic-Saharan) and since it is strongly employed in the phonological process of vowel harmony (Fulop et. al 1998). For more details on ATR harmony see Bashir (2010:32).

Advancing the tongue root [ATR] has its effect also on the quality of a Tima vowel. Tima vowels, as is true for many Niger-Congo languages, differ as to whether they are made with the tongue root in its normal position or pushed forward. As such, vowels are divided into two equal sets. Set A represents the vowels which are produced with tongue root advancement, i.e. [+ATR] [i, ë, ɪ, ø, ø, u] and set B constitutes the vowels that do not involve advancing of the tongue root in their articulation. These are [-ATR] [i, ë, ɪ, ø, ø, u] vowels. Also, it has been observed that the height of a vowel in one set seems to be the same as that for its correspondent in the other set. Research so far has made clear that the [ATR] feature is the prominent articulatory property distinguishing the two sets of vowels in Tima. But more investigation on the phonetic nature of [ATR] feature in Tima is needed. The two sets of Tima vowels are shown in (23):

\[(23)\]

<table>
<thead>
<tr>
<th>Set A [+ATR]</th>
<th>Set B [-ATR]</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>i</td>
</tr>
<tr>
<td>ë</td>
<td>ë</td>
</tr>
<tr>
<td>ɪ</td>
<td>ɪ</td>
</tr>
<tr>
<td>ø</td>
<td>ø</td>
</tr>
<tr>
<td>ø</td>
<td>ø</td>
</tr>
<tr>
<td>u</td>
<td>u</td>
</tr>
</tbody>
</table>

Now we turn to vowel quantity. As is the case for many languages, Tima has short and long vowels. Generally, a long vowel is twice as long as a short vowel. This is the case in Tima and many languages, though a language like Luanyjang Dinka (Remijsen 2009) 2 and Shilluk (Gilley 1992) distinguish

---

1 In investigating the phonetic nature of the [ATR] feature of Akan vowels, Lindau (1979) relates the distinction between the two sets mainly to an expansion of the pharynx, and the tongue root advancement, for her, is another feature accompanying the pharynx expansion. She noticed that set A vowels are produced with a wider pharynx and a lower larynx than the set B vowels.

2 A recent phonological study using acoustic correlates has been made by Bert Remijsen who presented it in a seminar titled 'Suprasegments of Shilluk'. The Seminar was held at the Department of Linguistics, University of Khartoum on 4 January 2008.
between three quantities of vowel length, i.e. short, mid and long. In Tima vowel length is retained only to a quantity of two vowels; if there is a sequence of three vowels at the abstract (morphophonological level) they are reduced to a two vowel sequence. This phenomenon is very clear across morpheme boundaries, where one of the three vowels is elided (Bashir 2010:152), or sometimes the length is broken by a glide (Bashir 2010:146). A related vowel quantity distinction is that between monothong vowels and diphthong vowels. However, this distinction is lacking in Tima, since it only distinguishes between short and long vowels of the same qualities. Tima does not allow a sequence of two different vowels, i.e. a diphthong; this is always avoided by an insertion of a glide.

The articulatory description of these vowels is shown in Table (6) below.

<table>
<thead>
<tr>
<th>[+ATR] vowel phones</th>
<th>[-ATR] vowel phones</th>
</tr>
</thead>
<tbody>
<tr>
<td>[i] highfront unrounded vowel</td>
<td>[i] highfront unrounded vowel</td>
</tr>
<tr>
<td>[i] highcentral unrounded vowel</td>
<td>[i] highcentral unrounded vowel</td>
</tr>
<tr>
<td>[ɛ] mid front unrounded vowel</td>
<td>[ɛ] mid front unrounded vowel</td>
</tr>
<tr>
<td>[a] lowcentral unrounded vowel</td>
<td>[a] lowcentral unrounded vowel</td>
</tr>
<tr>
<td>[o] mid back rounded vowel</td>
<td>[o] mid back rounded vowel</td>
</tr>
<tr>
<td>[u] high back rounded vowel</td>
<td>[u] high back rounded vowel</td>
</tr>
</tbody>
</table>

Table (6): Phonetic Inventory of Tima Vowels

It is worth mentioning that the transcription for vowels used in (30) adopts the IPA convention (revised 1993). However, for practical reasons, diacritics for tongue root advancement will not be used in the transcription of the data in the rest of the present paper and hence the following vowels are used instead:

<table>
<thead>
<tr>
<th>[+ATR] vowel set</th>
<th>[-ATR] vowel set</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>i</td>
</tr>
<tr>
<td>i</td>
<td>ɛ</td>
</tr>
<tr>
<td>u</td>
<td>o</td>
</tr>
<tr>
<td>e</td>
<td>ɔ</td>
</tr>
<tr>
<td>a</td>
<td>ɔ</td>
</tr>
</tbody>
</table>

2.5 Phonemic vowels

Tima has a twelve-vowel system divided equally in terms of the feature [ATR] into two sets: Set A constitutes [+ATR] vowels /i, i, ɛ, ɔ, u/ and set B comprises [-ATR] vowels /i, ɛ, a, ɔ, o/. In this respect, the vowel system of Tima tends to be symmetrical and it resembles that of many Niger-Congo languages. The inventory of Tima vowels is shown in Table (7).

<table>
<thead>
<tr>
<th>[±ATR] unrounded</th>
<th>[± ATR] rounded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>Central</td>
</tr>
<tr>
<td>High</td>
<td>i, i</td>
</tr>
<tr>
<td>Mid</td>
<td>e, ɛ</td>
</tr>
<tr>
<td>Low</td>
<td>ɔ, ɔ</td>
</tr>
</tbody>
</table>
Table (7) Inventory of Tima vowels

This inventory is further divided in terms of the feature [round]. The set of \([\pm ATR]\) unrounded vowels which include the front vowels /i, i, e, e/, and the central vowels /ə, ə, a, a/, and the set of \([\pm ATR]\) rounded vowels that include all back vowels /u, u, o, o/. In this respect the feature [back] is redundant for Tima vowels since it is predictable in the way that [+back] vowels are [+round] and [-back] vowels are [-round].

An additional feature that distinguished between Tima vowels is the feature [front] according to which the vowel inventory can also be divided into the set of \([\pm ATR]\) front unrounded vowels i, i, e, e and the set of \([\pm ATR]\) non-front rounded vowels u, u, o, o. The central vowels i, ə, a are thus, non-front unrounded vowels.

The height feature [high] also distinguishes Tima vowels so there is the class of high vowels which includes i, i, e, u, o and the class of non-high vowels which comprises e, e, ə, a, o, o. Evidence for the phonemic status of Tima vowels is shown in the following nearly identical minimal pairs.

(24)

\[
\begin{array}{lll}
/i/ & /ii/ & /kihi/
\end{array}
\]

'place'

\[
\begin{array}{lll}
/khihi/
\end{array}
\]

'needle'

\[
\begin{array}{lll}
/u/ & /ui/ & /iti/
\end{array}
\]

'grinders'

\[
\begin{array}{lll}
/iti/
\end{array}
\]

'clothes'

\[
\begin{array}{lll}
/i/ & /ii/ & /rih/
\end{array}
\]

'close'

\[
\begin{array}{lll}
/rih/
\end{array}
\]

'turn over'

\[
\begin{array}{lll}
/e/ & /ee/ & /iduwe/
\end{array}
\]

'blood’ FOC

\[
\begin{array}{lll}
/iduwe/\end{array}
\]

'marriage’ pl

\[
\begin{array}{lll}
/e/ & /ee/ & /ce\-c\-n\-a/
\end{array}
\]

'third born female'

\[
\begin{array}{lll}
/ce\-c\-n\-a/
\end{array}
\]

'kind of knife'

\[
\begin{array}{lll}
/\-a/ & /\-a/ & /ki\-n\-a/
\end{array}
\]

'brother from my mother'

\[
\begin{array}{lll}
/ki\-n\-a/
\end{array}
\]

'fourth born male child'

\[
\begin{array}{lll}
/a/ & /aa/ & /ma\-m\-o/
\end{array}
\]

'drink some' imp

\[
\begin{array}{lll}
/ma\-m\-o/
\end{array}
\]

'yawn'

\[
\begin{array}{lll}
/o/ & /oo/ & /tol\-o/
\end{array}
\]

'reconcile'

\[
\begin{array}{lll}
/tol\-o/
\end{array}
\]

'clean'

\[
\begin{array}{lll}
/o/ & /oo/ & /kom\-\-n/
\end{array}
\]

'fish'

\[
\begin{array}{lll}
/kom\-\-n/
\end{array}
\]

'a peal of grain'

\[
\begin{array}{lll}
/o/ & /u/ & /po\-to\-k/
\end{array}
\]

'make worm'

\[
\begin{array}{lll}
/hoo\-to\-k/
\end{array}
\]

'hiccup'

\[
\begin{array}{lll}
/u/ & /uu/ & /ku\-lu\-n/
\end{array}
\]

'thight'

\[
\begin{array}{lll}
/ku\-lu\-n/
\end{array}
\]

'smoke'

The distinctive features of Tima vowels are shown in table (8) below.

<table>
<thead>
<tr>
<th></th>
<th>i</th>
<th>i</th>
<th>e</th>
<th>e</th>
<th>i</th>
<th>ə</th>
<th>ə</th>
<th>a</th>
<th>a</th>
<th>o</th>
<th>o</th>
<th>u</th>
<th>u</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATR</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Round</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Front</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table (8) Distinctive features of Tima vowels

Apart from the [-ATR] high central /s/ which has been attested only in a short form, all the rest vowels of Tima can be short or long.

2.6 Distribution of Tima vowel phonemes

For vowel phonemes, the best environment to check their distribution is the syllable shape, i.e. in open and closed syllables. Tima vowels have a full distribution in all syllable patterns. Examples are shown in (25).

(25)

Open syllable V, CV

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>i.hi</td>
<td>'place' pl</td>
</tr>
<tr>
<td>'ki.mí.di</td>
<td>'breast'</td>
</tr>
</tbody>
</table>

Closed syllable VC, CVC

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ci.</td>
<td></td>
</tr>
<tr>
<td>dó.kóó</td>
<td>'person'</td>
</tr>
<tr>
<td>káh</td>
<td>'head'</td>
</tr>
</tbody>
</table>

2.7 Vowel length

The permissible vowel sequence in Tima is the sequence of two short vowels of the same quality which results in a long vowel. Tima avoids any VV sequence of different vowel qualities, therefore there is a consonant inserted between the two vowels to break such VV sequence (Bashir: 145).

Apart from the vowel /ə/, all Tima vowels can be lengthened. Examples of vowel length are shown in (26)\(^1\).

(26)

<table>
<thead>
<tr>
<th>Vowel</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>/i/</td>
<td>ìdìì 'leg' pl</td>
</tr>
<tr>
<td>/i/</td>
<td>ciidí 'thorn'</td>
</tr>
<tr>
<td>/i/</td>
<td>tiriík 'shelter'</td>
</tr>
<tr>
<td>/e/</td>
<td>wùdéèk 'cause to burn'</td>
</tr>
<tr>
<td>/e/</td>
<td>kicèwól 'aiming at'</td>
</tr>
<tr>
<td>/o/</td>
<td>cílòò 'half digested food'</td>
</tr>
<tr>
<td>/a/</td>
<td>ãmáá 'speech'</td>
</tr>
<tr>
<td>/u/</td>
<td>kúrúun 'belly'</td>
</tr>
<tr>
<td>/ɔ/</td>
<td>ànàkóó 'in the future'</td>
</tr>
<tr>
<td>/ɔ/</td>
<td>ãdótem 'wood pecker'</td>
</tr>
</tbody>
</table>

In addition to its inherent phonological nature, vowel length in Tima is also formed as a result of morphophonological processes. That is, when two (or more) vowel morphemes are adjacent, they fuse and make a sequence of two vowels (see Bashir 2010:135).

Vowel length in Tima occurs as well and can make a lexical contrast.

---

\(^1\) In addition to its inherent phonological nature, vowel length in Tima is also formed as a result of morphophonological processes. That is, when two (or more) vowel morphemes are adjacent, they fuse and make a sequence of two vowels (see Bashir 2010:135).
Identical minimal contrasts hardly occur, however, there at least some minimal pairs which proof that there is a contrastive vowel length in Tima. These minimal pairs are listed in (34)¹.

(27)

\[ /i/ \ /ii/ \ /kíhí/ \ 'place' \ /kíhíí/ \ 'needle' \]
\[ /i/ \ /ii/ \ /ííj/ \ 'grinders' \ /ííjí/ \ 'clothes' \]
\[ /i/ \ /ii/ \ /ríh/ \ 'close' \ /ríhí/ \ 'turn over' \]
\[ /e/ \ /ee/ \ /ídúúwé/ \ 'blood' FOC \ /íduwéél/ \ 'marriage' pl \]
\[ /e/ \ /ee/ \ /cèíčèŋ/ \ 'third born female' \ /cèèŋá/ \ 'kind of knife' \]
\[ /a/ \ /aa/ \ /máámu/ \ 'brother from my mother' \ /číŋáá/ \ 'fourth born male child' \]
\[ /a/ \ /aa/ \ /máámú/ \ 'drink some' imp \ /máámú/ \ 'yawn' \]
\[ /o/ \ /oo/ \ /tóóló/ \ 'reconcile' \ /tóól/ \ 'clean' \]
\[ /o/ \ /oo/ \ /kómóŋ/ \ 'fish' \ /komómón/ \ 'a peel of grain' \]
\[ /o/ \ /oo/ \ /pórúk/ \ 'make worm' \ /hoórók/ \ 'hiccup' \]
\[ /u/ \ /uu/ \ /kúlúŋ/ \ 'thigh' \ /kúrúún/ \ 'smoke' \]

In addition to the lexical function, vowel length has a grammatical role in Tima. That is, it shows up as a grammatical marker for the internal root vowel of some pluractional verbs whose singular forms have an internal short root vowel. (Bashir 2010:157). Consider the following examples.

(28)

Pluractional          singular
a. báár           bàrí          'peel'
b. múùn           múní          'insult'
c. túnú           túní          'plant'

2.8 Syllable structure and segmental word shapes

Tima has both open and closed syllables, which can be short or long. Most monomorphemic words consist of one or two syllables, whereby most combinations of open and closed, and short and long syllables are possible. Thus, the syllable structures are as follows:

¹ According to Ladefoged and Maddieson (1996:91) many languages in the world make considerable use of length contrast, for example the Arabic and Icelandic language. In Africa, as noted by Welmers (1973), contrast in vowel length is common among Niger-Congo languages.
Open syllables:  \((C)VV, (C)V\)

Closed syllables: \((C)VC, (C)VVC\)

The different syllable types of (37) are attested in monosyllabic and polysyllabic words.

2.8.1 Open syllables in monosyllabic words

\(V\) and \(VV\): The syllable pattern \(V\) has not been found, so far, among monosyllabic words. \(VV\) is attested in few examples:

\[(30)\]
\[
VV
\quad ^{\text{fi}}
\quad '\text{eye' pl}'
\]
\[
^\Lambda\Lambda
\quad '\text{belch' imp}'
\]

\(CV\): The \(CV\) pattern is commonly found in contracted words, i.e. clitics or prepositions words.

\[(31)\]
\[
CV
\quad ^{n\acute{a}/n\acute{a}}
\quad '\text{with or and}'
\]
\[
d\acute{a}/d\acute{a}
\quad '1\text{sg' non-ergative}'
\]

\(CVV\): The \(CVV\) pattern occurs in nouns as well as in verbs:

\[(32)\]
\[
CVV
\quad ^{c\ddot{i}}
\quad '\text{eye'}
\]
\[
h\ddot{i}
\quad '\text{spit' imp}'
\]

2.8.2 Closed syllables in monosyllabic words

\(CVC\): This syllable structure is found in nouns but it is more frequent in verbs, especially pluractional verbs:

\[(33)\]
\[
CVC
\quad ^{k\hat{a}h}
\quad '\text{head'}
\]
\[
c\hat{e}h
\quad '\text{a seed of sorghum'}
\]
\[
k\hat{h}
\quad '\text{straw of sugar cane'}
\]

\(CVVC\): This pattern is the common pattern in monosyllabic nouns and verbs:

\[(34)\]
\[
CVVC
\quad ^{t\ddot{o}\acute{r}}
\quad '\text{water pot'}
\]
\[
h\ddot{o}\acute{r}
\quad '\text{quickly'}
\]
\[
w\acute{e}n
\quad '\text{mother'}
\]

\(VVC\): So far, the \(VVC\) pattern has been found in only one monosyllabic verb
2.8.3 Open syllables in disyllabic words

The syllable structures of V and VV are widely distributed in disyllabic words. They are usually the initial syllables of the plural nouns that particularly belong to class kV-/i,-r-, because each noun root is attached to the vocalic plural prefix i-/i-r; there is also a class of verbs which has an initial open syllable (see Chapter Seven for syllable structures of verbs). The examples for nouns, below, illustrate plural forms.

(36)

V
- ọ.lèm    'bite'
- ú.lúù    'spread smooth things'
- ó.lọ̀    'at home'

VV
- ii.ídí    'water'
- ii.ǹjì    'clothes'

Pattern CV and CVV: The patterns CV and CVV are common patterns in disyllabic Tima nouns and verbs. The CV syllable structure is the most common pattern that occurs in all word positions as it is attested word-initially, word-medially and word finally. The open syllable with long vowel CVV rarely occurs word-finally.

(37)

CV
- kó.nò    'ear'
- dò.tó    'heifer'
- mi.né    'divide' imp

CVV
- kii.ráŋ    'field'
- cii.dìŋ    'moon'
- i.dúú    'blood'

2.8.4 Closed syllables in disyllabic words: CVC and CVVC

CVC and CVVC are also common patterns in Tima disyllabic words. They are distributed as initial as well as final syllables.

(38)

CVC
- kòl.òá    'feather'
- kúr.dák    'male sheep'
- ráŋ.kàl    'crawl'
CVVC  kù.múúl  'bull'
tóó.tóók  'wood pecker'
à.bàår  'not yet'

Open and closed syllables are also attested in words with three and four syllables. These are illustrated below.

2.8.5 Thri-syllabic words

(39)
CV.CV.CVC  bö.kó.lòŋ  'oldness'
CV.CV.CVC.CVVC  kù.ràŋ.kíík  'rooster'
CV.CV.CVVC  dòŋ.kó.tòk  'spear'

2.8.6 Quqdri-syllabic Words

(40)
V.CV.CV.CVVC  i.bi.¹rí.hàk  'wash' 1pl incl
V.CV.CV.CV  à.hòn.dó.no  'sit' 3sg past
CV.CV.CV.CVVC  ki.ràn.kà.lál  'crawling'

A few examples of words with five syllables are also attested.

(41)
V.CV.CV.CV.CV  i.wè.tè.wè.tèk  'hanger'
V.CV.CV.CV.CV  i.bà.rím.bà.rì  'children'

2.9 Phonotactics on Tima syllable structure

Cross-linguistically, there is a strong tendency for languages to show an asymmetry in the choice of segments permitted in onsets and codas. That is, the possible sequences of sounds in a syllable differ from language to language and are limited in each language (Finegan 2004). In Tima, a greater variety of consonants and consonant clusters are permitted in the onset than in the coda. All obstruent and sonorant consonants are allowed to occupy the onset position whereas in the coda only sonorants and very few obstruents may occur. In addition, a cluster (although restricted) is allowed in the onset but not in the coda.

As for the obligatory or optional constituent of Tima syllables, the nucleus is the only obligatory constituent in the phonological syllable and the onset and the coda are considered as optional constituents since they can be occupied by the glottal stop in words in isolation. However, when these words are combined with another word or attached by a clitic, the frequent glottal stop disappears.

3 Suprasegmental sounds: Tone
3.1 The identification of Tima tones

Tima is a tone language like many Niger-Congo languages. It has a terraced tone system with two distinct tonal units; a high tone (H) and a low tone (L) plus a downstepped high tone (H^1H). The downstepped tonal phoneme which operates only in the context HH is derived from a general rule of downdrifted high tone regularly occurring in the language. In addition to the level tones high and low, Tima also has compound tones; falling (F) and rising (R). Compound tones are sequences of the level tones high and low and vice versa. Tones, in the following description, will be marked as follows:

High as in: á  Low as in: à
Falling as in: â  Rising as in: á

Downstepped high (or downdrift) is marked by a superscript arrow (\(^1\)) written above the syllable juncture as in: á\(^1\)á.

3.2 Distribution of level tones

The level tone in Tima occurs when one syllable, with short or long vowel, has one level tone pitch. The tone pitch may be high or low.

3.2.1 High tone

The high tone occurs in all syllable patterns. It is found in monosyllabic and disyllabic words as shown below, respectively.

3.2.1.1 High tone in monosyllabic words

The following examples illustrate the occurrence of high tone in monosyllabic words:

(42)

ñål   H   'smell'
pål   H   'shoot v.pluract'
tór   H   'solve'

3.2.1.2 High tone in disyllabic words

The high tone also shows up in disyllabic words, as shown in the following patterns:

(43)

H.H   kiji   'grinder'
cídín   'vein'
cércér   'write' imp
3.2.2 Low tone

3.2.2.1 Low tone in monosyllabic words

Like the high tone, the low tone is found in all syllable patterns. The low tone is not attested in monosyllabic words with a short vowel. Only few monosyllabic words with a long vowel carrying a low tone are found in the language. Examples are shown in (52):

(44)

L

hòòr  'quickly'
kwùlì  'rope'

3.2.2.2 Low tone in disyllabic words

The distribution of the low tone in disyllabic words is shown in (53):

(45)

L.L

ihi  'milk'
àràŋ  'leopard'
pùrwà  'swept'

L.H

cinjì  'fire'
ihu  'places'
kòbá  'well'

The high and low tones are also found in tri-syllabic words. Consider the examples.

(46)

H.H.H

kòbòbòn  'water spring'

H.H.L

kòkòhák  'slaughter'

H.L.L

bìrìhák  'wash'

Whereas the high and low tones show a full distribution in different syllables within a word pattern, they also prove their distinctive status by the following minimal pairs:
(47)  
a. ihi  'milk (noun)'  İhî  'milk (verb)'  
b. kódà  'shoe'  kódâ  'kind of snake'  
c. cînjî  'feaces'  ciŋî  'fire'  
d. kôlbâ  'seed for growing'  kòlbá  'feather'  
e. kólñà  'delivery'  kòlnâ  'feast'  
f. kibâññ  'friend'  ábâr  'not yet'  
g. dîñâ  'get up' plur  dîñé  'get up' once  
h. kótà  'take' plur  köti  'take' (it)  

3.2.3 The distribution of sequence level tones  
The Tima language allows the sequence of one level tone (high or low) on a long vowel of a single syllable, and it also allows the combination of high and low tones on a short or long vowel of a single syllable. This means that vowel length in Tima is independent of the complexity of tone. The distribution of possible tone sequences is described below.  

Among monosyllabic words, the pattern HH is quite uncommon. In the disyllabic and tri-syllabic words, the tone pattern HH can occur in the initial, middle and the final syllable position. The distribution of HH tone pattern in different syllable patterns is shown in (48):  

(48)  
a. kúúr  'bark'  
b. cidíñ  'moon'  
c. kôdàâ  'a family clan'  
d. bókàâ  'put it'  

3.2.4 The distribution of compound tones  
The compound tones in Tima are patterns of level tones H and L in one syllable. The compounded level tones may occur in a syllable with either short or long vowel. The combination of a high tone followed by a low tone is known as falling tone which is indicated by /\ written above the vowel of the syllable. The combination of a low tone followed by a high tone is known as rising tone indicated by /\ . The falling tone in Tima is very common among monosyllabic words. It occurs in disyllabic as well as trisyllabic words. The falling tone is common in monosyllabic verbs and nouns but in disyllabic and tri-syllabic words (commonly nouns) it is restricted to the final syllable position. Like the falling tone, the rising tone occurs commonly in the final syllable of disyllabic and tri-syllabic words. The rising tone is rare in monosyllabic words.  

Examples of the falling and rising tone in different syllable patterns are shown in
3.2.5 Downdrifted high tone

The Tima language has an automatic downdrift of the pitch of a high tone after an overt low tone. This downdrift is predictable, because it is conditioned by the immediately preceding low tone in the tonal phrase. Whereas the downdrift in Tima is predictable, it is not significant, then, to be indicated in the phonemic transcription which is adopted in this description. In examples (50), the low tone in the second syllable of the first noun lowers the high tone in the following possessive pronoun lééñí ‘my’.

(50)

\[ \text{a. [cibå+lééñí]} \quad > \quad [\text{cibå lééñí}] \]

\[ [- - - -] \quad > \quad [- - -] \]

'my child'

Downdrift in Tima has also the effect of automatically lowering all the subsequent high tones in the same tonal phrase. See the example in (51):

(51)

\[ \text{a. [cibå+wåyèn+lééñí]} \quad > \quad [\text{cibå wåyèn lééñí}] \]

\[ [- - - - -] \quad > \quad [- - - - -] \]

'my father's child'

As is shown by the above examples, the final low tone in the words cibå ‘child’ and ådi ‘water’ cause the following high tones to drift down all at the same level.

Whenever the low tone which controls downdrift, as has been shown in the (50) and (51), is lost for any reason in the tonal phrase, its effect remains and results in a downstep.

3.2.6 Downstepped high tone

The downstep (or downstepped high tone) is a tonal unit in Tima which receives a phonemic status when the low tone that conditions the downdrift is lost. But unlike high and low tones it has a restricted distribution. The downstepped high tone (whose pitch is phonetically realized as mid pitch) never occurs in a monosyllabic word nor does it show up as an initial syllable of a polysyllabic word and never follows a low tone. It only occurs in a syllable following another syllable carrying a high tone, i.e between two high tones. We shall mark the downstep with a superscript arrow (\( ^{1} \)) above the syllable juncture.
within which it coincides. The pitch of the downstepped high tone rarely occurs in isolated disyllabic words, in our data it is attested in a few words, as in (52):

(52)
a. yéé⁴dí  
   H⁴H  
   'thirst'
b. yéé⁴dó  
   H⁴H  
   'captive'

It is also attested in some trisyllabic words, as in (53):

(53)
a. kílií⁴lí  
   H.H⁴H  
   'shadow'
b. kihád⁴ú  
   H.H.¹H  
   'oven'
c. kóm¹pórëŋ  
   H.¹H.H  
   'flute'

A contrast between high tone and downstep is also attested. Compare the following two tonal phrases:

(54)
a. kúrtú kótón  
   [. - ] [. - ]  
   'the black house'
b. kókwán¹kódón  
   [. - ] [. - ]  
   'the high door'

Downstep in Timo commonly shows up in large tonal phrases such as compounds where two syllables of high tones are adjacent. See the examples in (55):

(55)
a. kúmú́ul + cíhí  
   [... + - -]  
   'kind of insect'

   bull + earth
   > kúmú́ul¹cíhí  
   [... + - -]  
   > [... + - -]
In accordance with this distributional pattern, downstep in Tima is considered to be a variant of a high tone, after a lost or delinked low tone. We may conclude, then, that the downstep in Tima is a phonetically distinctive tonal level next to a high tone and a low tone. But it should not be considered as an independent third level toneme, i.e. a mid tone. Therefore, Tima is said to have a two-tone system with downdrift and downstep. This is also observed by Dimmendaal (2009:335).

3.3 The lexical function of Tima tone

Since one is dealing with a tone language, the difference in lexical meaning between words in Tima may be established by means of tone. Accordingly, tone in Tima plays a lexical role. In some cases it is alone the decisive factor in lexical distinction, as shown in (56a-e) while in others it contributes with other elements, e.g. phonemes such as in (56f-h). There are numerous minimal contrasts in tone among nouns and between nouns and verbs. Identical minimal pairs are not common, but the contrast is shown in nearly minimal pairs in (56):

(56)

a. kò 'family' kò 'walking'  
b. kòlbà 'well' kòlbà 'seed'  
c. kòlnà 'feast' kòlnà 'feather'  
d. kùrùn 'smoke' kùrùn 'belly'  
e. ihi 'milk' noun ihi 'milk' verb  
f. kidék 'neck' cídik 'one seed of beans'  
g. ibí 'roast' cibí 'tree'  
h. ihi 'milk' verb ihi 'place'

3.4 The grammatical function of Tima tone

So far, the grammatical function of Tima tone is attested in two grammatical constructions. First, it distinguishes between perfective and imperfective verbs. The perfective verbs are marked with a suffix with high tone whereas the verbal suffix of the imperfective verbs carries a low tone. For Example:

(57)

<table>
<thead>
<tr>
<th>Imperfective verbs</th>
<th>Perfective verbs</th>
</tr>
</thead>
</table>

1 Efik (Winston 1960) (Hyman 1975) and some other Niger-Congo have a downstep which results from a loss of a low tone undergoing a downdrift rule.

2 In some tonal phrases, the downstepped high tone has the effect of lowering the subsequent high tones gradually up to the final high tone which is realized as a low tone (see Bashir 2010: 108)
a. túw-ā 'take/is taking a rest'  túw-ā 'took a rest'
b. túw-à 'throw it down'  tòw-à 'threw it down'
c. pòŋ-ā 'opens mouth'  pòŋ-ā 'opened mouth'
d. dòw-ā 'remains/is standing'  dòw-ā 'get down'
e. dòy-ā 'steals/is stealing!

Second, tone in Tima helps to make a grammatical distinction between the progressive aspect in the present and the progressive aspect in the past. The morpheme used for progressive aspect is the proclitic ce-, ce- (alt. in terms of the feature [ATR] of the following vowel (Bashir 2010: 219). In the present progressive aspect this proclitic carries high tone and in the past progressive aspect it has a low tone. Compare the following utterances in (58) a and b.

(58)
Present progressive aspect
a. cèm1 birih-āk-i-dā 'I am washing'
PROG.1sg-wash-AP-EPEN-1sg
Past progressive aspect
b. cèm- birih-āk-i-dā 'I was washing'
PROG.1sg-wash-AP-EPEN-1sg

4. Summary
As for segmental phonemes, this paper concludes that Tima has 22 consonant phonemes out of 32 phones; the ten remaining phones are allophones. Out of theses allophones, only the labialized consonants and the rounded palatal glide are conditioned allophones; the remaining phones are free allophones. There is a systematic gap in the distribution of obstruents, in word-final position. Apart from this, all Tima consonant phonemes seem to be in contrastive opposition to each other. There is no evidence for neutralization in the language. The 12 vowel phonemes of Tima are divided equally in terms of the feature ATR. These vowels can be short or long and vowel length is contrastive. All vowels, short and long, occur in all syllable patterns. Words can have open and closed syllables. The types of syllables identified are: V, VV, CV, CVV, CVC, and CVVC. The most common syllable types to occur in the word are the open syllable CV(V) and the closed syllable C(V)VC. The length of a Tima word may be up to five syllables. There are some restrictions on CC sequences in Tima. The permissible CC sequences attested are: nasal plus stop, liquid plus stop, liquid plus nasal and the clusters kw, tw and hw. The suprasegmental feature on which this study focuses is tone. Tima has two tone levels, high and low, with downstep and downdrift. The downdrift is predictable from the context, since it usually occurs after a low tone. Downstep is restricted to HH sequences, as H¹H. It is sometimes predictable, especially across a morpheme boundary, i.e. when
the sequence HH represents two tones of successive morphemes. However, downstep is sometimes not predictable. This is the case when it appears across a syllable boundary. In a single word therefore it has been concluded that downstep in Tima is a variant of a high tone after the loss of low tone with time that once triggered a downdrift rule; therefore, it is considered as a unit tone in addition to high and low tones. Tima also has compound tones, falling and rising, which are interpreted as a sequence of high and low tones. Compound tones commonly show up in monosyllabic words with short and long vowels and in long final open syllables.

**Abbreviations & Symbols**

**Abbreviations:**

1sg  
First person singular

2sg  
Second person singular

3sg  
Third person singular

FOC  
Focus marker

NC.sg  
Noun class singular

NC.pl  
Noun class plural

Plur  
Plurational

PROG  
Progressive aspect

Son  
Sonorant

**Symbols:**

-  Morpheme boundary

.  Syllable boundary

>  Become (s)

<  Derived from

+  Boundary between two elements of compound

*  Ungrammatical form/sentence
Bibliography