CHAPTER 2

SEGMENTAL PHONOLOGY

2.0 Introduction

This section decribes the segmental phonology of Falam. According to *A dictionary of Linguistics and Phonetics* (Crystal 2003:408), "Segmental phonology analyzes the speech into distinctive units, or phonemes, which have a fairly direct correspondence with phonetic segments." This section is divided into two main sections: consonants and vowels, including their variations.

2.1 Consonants

The consonant phonemes of Falam are displayed in Table 3:

	Labial	**Labio-dental**	**Dental**	**Alveolar**	**Palatal**	**Velar**	**Glottal**
Voiceless stops	p		t̪	t		k	ʔ
Voiceless aspirated stops	p^h		$t̪^h$	t^h		k^h	
Voiced stops	b		d̪				
Voiceless nasals	m̥			n̥		ŋ	
Voiced nasals	m			n		ŋ	
Voiceless fricatives		f		s			h
Voiceless affricate				ts			
Voiceless lateral affricate				tɬ			
Voiceless aspirated lateral affricate				$tɬ^h$			
Voiceles flap				ɾ̥			
Voiced flap				ɾ			
Voiceless lateral approximant				l̥			
Voiced lateral approximant				l			
Glides	w				j		

Table 3. Consonant phonemes

This analysis proposes that there are eleven phonemic oral stops in Falam. The stops have five places of articulation, labial /p, p^h, b/, dental /t̪, $t̪^h$, d̪ /, alveolar /t,

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t^h /, and velar /k, k^h/, and glottal /ʔ/ which will be desribed thoroughly in Section 3.3.2. All but /ʔ/ have contrasts between aspirated and unaspirated phonemes. A voiceless bilabial stop /p/ and a voiceless dental stop /t̪/ have voiced contrasts. But a voiceless alveolar /t/ and a voiceless velar /k/ have no contrastive voiced phonemes, /d/ and /g/, which are common in many languages. Unaspirated oral stops are unreleased [pˀ, tˀ, kˀ] when they occur word finally. These unreleased stops are treated as allophones of the phonemes /p, t, k/ respectively as will be seen in Section 2.1.2.1.

A glottal stop /ʔ/ is analysed as a phoneme even though it is restricted to occurring as the final element of a word. In word final position the glottal stop has complete closure and full articulation and is significant. It frequently occurs and demonstrates a number of peculiarities that set it apart from the other consonantal segments. It has a high frequency of occurrence, a substantial number of lexical verb roots have an underlying final glottal stop and it contrasts with other phonemes and with zero (ø) as will be seen in Section 2.1.1.

As a phoneme, a glottal stop has some more restrictions. The realisation of the glottal stop almost always occurs with low tone, and never allows a long nucleus. In addition to being constrained to occurring word-finally, the glottal stop is the only consonant that can occur after sonorants /l, r, j, and w/ in the coda, as in Section 3.3.1 example (21), but not after nasals and oral stops. A glottal stop also occurs as the final element of grammatical morphemes such as conjunction /iʔ/, locative /iʔ/, and possessive /iʔ/ morphemes, but if these morphemes occur word-internally, then the glottal stop of these morphemes is consistently deleted as will be shown in Section 5.1.3.3, examples (54) and (53). Moreover, the phonological status of the glottal stop in Falam appears to be somewhat ambiguous because of its dual functions. In some respects its unique distributional characteristics suggest that it does not have the same status as the oral stop segmental phonemes (oral stops can occur all four tones and can occur

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with long vowels but the glottal can occur only with low tone, sometimes with high tone, and does not allow long vowels), yet in a phonemic analysis it clearly demonstrates a contrastive function as will be shown in Section 2.1.1. On the other hand, there is no consonant deletion rule word-internally while a glottal stop can be deleted word-internally. There is an exceptional occurrence of the glottal stop with high tone. Syllables closed with glottal stop and glottalized syllables can have high tone when they appear in secondary verb stems. Also a conjunction morpheme in Falam is pronounced with high tone as /iʔ^{44}/. As mentioned above the glottal stop is very ambiguous and as such it is a good topic for further study.

There are six nasal phonemes in Falam. The nasal phonemes occur in three places of articulation, labial /m, m̥/, alveolar /n, n̥/, and velar /ŋ, ŋ̊/. They are contrastive in voicing. It is observed, however, that the nature of the phonetic realization of the voiceless nasals can be substantially similar with that of the aspirated stops.

There are voiceless fricatives in three places of articulation: labiodental /f/, alveolar /s/, and glottal /h/. There are also voiceless flap /ɾ̥/ that contrasts with voiced alveolar flap /ɾ/.

There is one voiceless alveolar sibilant (grooved) affricate /ts/. In the case of this affricate, the phoneme /ts/ occurs as a unit even though these two phonemes /t/ and /s/ occur as separate phonemes in elsewhere. There is a voiceless alveolar lateral affricate that has an aspirated contrast /tɬ, tɬ^{h}/ (see also Section 3.3.1).

Falam has two glides: the palatal /j/ and the labial /w/ (an alternative term for such sounds is semivowel). The palatal /j/ involves an articulation similar to that for the vowel /i/, with the front of the tongue close to the palate; the labial /w/ is similar to /u/, with rounded lips and the back of the tongue raised toward the velum. The two glides are in free variation with voiced fricatives word initially

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and they occur significantly in word final positions and they are considered as phonemic consonants /j, w/ in this analysis[16]. In addition, transcribing these two phonemes as consonants rather than the vowels /u/ and /i/ agrees with the phonemic realization of free variation between [v] and /w/, and between [z] and /j/ as will be seen in examples (2) and (3).

2.1.1 Consonant contrasts

Evidences for consonant phonemes are provided below:

/p/ : /p^h/

CIE #352 /puan^{21}/ 'to be shallow'	#285 /p^huan^{21}/ 'to float'
CIE #435 /piat^{52}/ 'to eat (by animal)'	#291 /p^hiat^{52}/ 'to rub'
CNE #139 /pum^{21}/ 'to be round'	#300 /p^hun^{44}/ 'to plant'

/p/ : /b/

CIE #50 /paa^{44}/ 'mushroom'	#436 /baa^{44}/ 'ground potato'
CIE #230 /puaɾ^{23}/ 'to be full'	#437 /buaɾ^{23}/ 'to break the law'
CNE #314 /pɛɛl^{44}/ 'to hunt'	#205 /bɛɛl^{23}/ 'cooking pot'

/t/ : /t^h/

CIE #438 /taŋ^{23}/ 'to resist'	#439 /t^haŋ^{23}/ 'to grow'
CIE #439 /tum^{44}/ 'to get down'	#440 /t^hum^{44}/ 'to be lower'
CNE #465 /taaŋ^{23}/ 'chest'	#476 /t^haŋ^{21}/ 'to wake up'

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[16] For example: /aw/ is transcribed as VC and will not be considered as a diphthong /ao/, which would be considered VV, though there are also diphthongs in Falam.

/t̪/ : /t̪ʰ/

CIE #23 /t̪ii^{44}/ ‘water’ #164 /t̪ʰii^{44}/ ‘blood’

CIE #369 /t̪aɾ^{23}/ ‘to be old’ #368 /t̪ʰaɾ^{23}/ ‘to be new’

CIE #441 /t̪ɔɔŋ^{21}/ ‘to confront’ #441 /t̪ʰɔɔŋ^{21}/ ‘to punch’

/ tʰ / : /t̪ʰ/

CIE #200 /tʰii^{23}/ ‘to sew’ #269 /t̪ʰii^{23}/ ‘to die’

CIE #201 /tʰim^{23}/ ‘needle’ #370 /t̪ʰim^{23}/ ‘to be dark’

/t̪/ : /t/

CIE #444 /t̪um^{44}/ ‘to play music’ #439 /tum^{44}/ ‘to get down’

CIE #271 /t̪aw^{23}/ ‘to sit’ #445 /taw^{23}/ ‘seedling’

CNE #196 /t̪aʔ^{21}/ ‘to measure’ #226 /tap^{21}/ ‘to cry’

/d̪/ : /t̪/

CIE # 479 /d̪aw^{23}/ ‘to fight’ #271 /t̪aw^{23}/ ‘to sit’

CIE #449 /d̪ɔk^{21}/ ‘to leak’ #450 /t̪ɔk^{21}/ ‘to point’

/k/ : /kʰ/

CIE #447 /kaw ^{23}/ ‘to call’ #446 /kʰaw^{23}/ ‘bowl’

CIE #448 /kuʔ^{21}/ ‘to be green (fruits)’ #236 /kʰuʔ^{21}/ ‘to cough’

CIE #396 /kɔlʔ ^{21}/ ‘to be bald’ #294 /kʰɔlʔ^{21}/ ‘to bathe’

/p/, /t/, /k/ : /ʔ/

CIE #250 /sak^{21}/ ‘to build’ #449 /saʔ ^{21}/ ‘to be thick’

CIE #197 /but^{21}/ ‘to dye (cloth)’ #79 /buʔ^{21}/ ‘cooked rice’

CIE #494 /kʰup^{21}/ ‘to put upside down’ #236 /kʰuʔ^{21}/ ‘to cough’

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/ø/ :/ʔ/

CIE #250 /kua^{21}/ 'hold' #449 /kuaʔ^{21}/ 'to hug'

CNE #48 /ɾua^{23}/ 'bamboo' #7 /ɾuaʔ^{21}/ 'rain'

CNE #129 /n̥aa^{23}/ 'ear' #43 /n̥aʔ^{21}/ 'leaf'

/m/ : /m̥/

CIE #46 /muu^{52}/ 'seed' #224 /m̥uu^{52}/ 'to see'

CNE #90 /mɛj^{44}/ 'tail' #178 /nu^{21}.m̥ɛj^{21}/ 'widow'

CNE #337 /mal^{44}/ 'to be few' #409 /m̥in^{23}/ 'to be ripe'

/n/ : /n̥/

CIE #450 /naa^{23}/ 'to be sick' #129 /n̥aa^{23}/ 'ear'

CNE #451 /naal^{44}/ 'to be slippery' #127 /n̥aaɾ^{21}/ 'nose'

/ ŋ / : / ŋ̥/

CIE #156 /ŋal^{23}/ 'shin' #518 /ŋ̥al^{23}/ 'to be stubborn'

CNE #101 /ŋaa ^{52}/ 'fish' #257 /ŋ̥aak^{52}/ 'to wait'

CNE #222 /ŋaaj^{23}/ 'to hear' #419 /ŋ̥aaj ^{44}/ 'plural marker'

/n/ : /ŋ/

CIE #180 /naaw^{23}/ 'brother' #77 /ŋaaw^{23}/ 'gibbon'

CNE #221 /naam^{44}/ 'knife' #222 /ŋaaj^{23}/ 'to hear'

CNE #88 /naa^{44}/ 'buffalo' #101 /ŋaa^{52}/ 'fish'

/n̥/ : /ŋ̥/

CIE #160 /n̥aak^{52}/ 'rib' #257 /ŋ̥aak^{52}/ 'to wait'

CNE #43 /n̥aʔ^{21}/ 'leaf #453 /ŋ̥at^{21} .san^{52}/ 'to trust'

CNE #413 /n̥iit^{52}/ 'water leech' #262 /ŋ̥ɔɔk^{44}/ 'to snore'

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/f/ : /w/

CIE #454 /faaɾ^{23}/ 'torch' #363 /waaɾ^{23}/ 'white'

CIE #274 /fɛʔ^{21}/ 'to walk' #455 /wɛʔ^{21}/ 'to visit patient'

/s/ : /j/

CIE # 343 /saaŋ^{23}/ 'to be tall, high' #138 /jaaŋ^{23}/ 'back'

CNE #306 /suaŋ^{44}/ 'to cook #456 /juaŋ^{23}/ 'to fly'

/s/ : /h/

CIE # 343 /saa^{23}/ 'to be hot' #133 /haa^{23}/ 'tooth'

CIE #250 /sak^{21}/ 'to build' #456 /hak^{21}/ 'to be hard'

/ts/ : /s/

CIE #46 /tsii^{52}/ 'seed' # 457 /sii^{52}/ 'to be'

CIE #458 /tsaw^{23}/ 'to receive' # 307 /saw^{23}/ 'to boil'

CNE #71 /tsii^{21}/ 'salt' #265 /sii^{23}/ 'medicine'

/tɬ/ :/tɬ^{h}/

CIE #283 /tɬaa^{52}/ 'to fall ' #460 /tɬ^{h}aa^{52}/ 'cause to fall'

CNE #459 /tɬaaj^{44}/ 'to be late' #95 /tɬ^{h}aa^{21}/ 'wing'

CNE #35 /tɬaaŋ^{23}/ 'mountain' #22 /tɬ^{h}aŋ^{21} .lam^{44}/ 'south'

/tɬ^{h}/ : /l̥/

CIE #374 /tɬ^{h}um^{23}/ 'to be sweet' #479 /l̥um^{23}/ 'to be warm'

CNE #481 /tɬ^{h}aa^{52}/ 'caused to fall' #358 /l̥aa^{44}/ 'to be far'

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/tɬ/ : /ts/

CIE #478 /tɬuŋ^{44}/ 'go towards home' #463 /tsuŋ^{44}/ 'to pick (over, upon)'

CIE #520 /tɬaan^{44}/ 'to flee' #521 /tsaan^{44}/ 'to be lost (portion)'

CIE #480 /tɬɔ:ŋ^{23}/ 'to travel, to visit' #464 /tsɔ:ŋ^{23}/ 'to imitate'

/tɬ/ : /t/

CIE #35 /tɬaaŋ^{23}/ 'mountain' #465 /taaŋ^{23}/ 'chest'

CNE #371 /tɬɛɛw^{23}/ 'to be bright' #289 /tɛɛm^{23}/ 'to tie'

CNE #27 /tɬak^{21}/ 'mud' #476 /tap^{21}/ 'to cry'

/l/ : /l̥/

CIE #468 /law^{21}/ 'negation marker' #472 /l̥aw^{21}/ 'to be lost'

CNE #475 /liam^{44}/ 'to overflow' #264 /l̥iam^{21}/ 'to hurt'

/ɾ/ : /r̥/

CIE #321 /ɾuu^{52}/ 'to steal' #473 /r̥uu^{52}/ 'to wear'

CIE #380 /ɾaw^{23}/ 'to be dry' #470 /r̥aw^{23}/ 'to scold'

CNE #144 /ɾil^{23}/ 'intestines' #111 /r̥il^{23}/ 'to choose'

/l/ : /ɾ/

CIE #131 /lɛj^{23}/ 'tongue' #477 /ɾɛj^{23}/ 'to be last long'

CIE #242 /liak^{52}/ 'to lick' #471 /ɾiak^{52}/ 'to sleep at night'

/l̥/ : /r̥/

CIE #467 /l̥uum^{44}/ 'to be round' #474 /r̥uum^{44}/ 'to be roar'

CIE #41 /l̥iŋ^{23}/ 'thorn' #365 /r̥iŋ^{23}/ 'to be green'

CNE #264 /l̥iam^{21}/ 'to be far' #384 /r̥iam^{23}/ 'to be sharp'

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ø: /j/

CIE #130 /kaa^{23}/ 'mouth'	#469 /kaaj^{23}/ 'to climb up'
CIE #133 /haa^{23}/ 'tooth'	#59 /haaj^{23}/ 'mango'
CNE #423 /laa^{52}/ 'to take'	#140 /laaj^{23}/ 'navel'

ø: /w/

CIE #466 /naa^{23}/ 'to be sick'	#180 /naaw^{23}/ 'brother, sister'
CNE #382 /saa^{23}/ 'to be hot'	#341 /saaw^{44}/ 'to be long'
CNE #152 /kɛɛ^{21}/ 'leg'	#83 /kɛɛw^{52}/ 'to bite'

2.1.2 Variation of Consonants

There are two types of consonant variation in Falam, namely, allophonic variation[17] and free variation[18].

2.1.2.1 Allophonic variation

Unaspirated stops /p, t, k/ and the unreleased [p˺, t˺, k˺] are in complementary distribution. The unaspirated stops always occur word initially and the unreleased stops always occur word finally. These phones are phonetically similar, and they are called variants or allophones of the same phoneme as in (1):

(1) **Allophonic rule**: /p, t, k/ → [p˺, t˺, k˺]/ __#

/puan/ 'to shallow'	[tsuap˺] 'lung'
/kɛɛw/ 'to bite'	[kɔɔk˺] 'to scold'
/tum/ 'to get down'	[k^{h}at˺] 'to be full'

[17] The variation in sound is conditioned by the environment in which the sound occurs.

[18] Phones are not affected by the environment but there is a free choice between one phone and the other.

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2.1.2.2 Free variation

There is a phonetic difference between [v] and [w] in word initial positions but these two segments can be substituted for each other without changing the meaning of the word. All syllables beginning with [v] can be pronounced as [w] in connected speech or rapid speech. This condition can be found at the word level, phrase level, and clause level. [z] and [j] also follow the same pattern of [v] and [w]. Therefore, this analysis proposes that [v] and [w] as well as the [z] and [j] are in free variation in Falam. In this variation, /w/ and /j/ have wider distributions, they occur significantly word finally while they are in free variation with [v] and [z] word initially. Therefore, /w/ and /j/ are chosen to be the underlying form to keep the phoneme chart simpler. Examples of free variation are provided in examples (2) and (3):

(2) **Free variation rule** : /w/ ~ [v]/#___

/wɔk^{21} saa^{52}/ ~ [vɔk^{21} saa^{52}] 'pig meat'

wɔk^{21} saa^{52} na^{21} d̰uʔ^{44} mɔɔ^{21}

pig meat 2S want Qp.

do you want pork?

(3) **Free variation rule** : /j/ ~ [z]/#___

/juaŋ^{23}/ ~ [zuaŋ^{23}] 'to fly'

waa^{21} tɛɛ^{44} pɔɔl^{21} an^{44} juaŋ^{23} ɾɛɛ^{21}raw^{21}

bird Pl. 3P fly continuously

Birds are flying.

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2.2 Vowels

This analysis proposes that Falam has five single vowel phonemes. The vowel phonemes in Falam are shown in Table 4.

	Front	Central	Back
Close	i		u
Open-mid	ɛ		ɔ
Open		a	

Table 4. Vowel phonemes

There are two front vowels: the close front unrounded vowel /i/ and an open mid front unrounded vowel /ɛ/. The two back vowels are the close back rounded vowel /u/ and an open mid back unrounded vowel /ɔ/. Length is contrastive in Falam (see Section 3.3.4), but long vowels will be regarded as a sequence of two indentical vowels (see Section 3.3.3).

There are also two diphthongs in Falam: the front diphthong /ia/ and the back diphthong /ua/. The front diphthong /ia/ is an opening diphthong starting from a close front vowel position to an open central vowel position. Examples of front diphthong are shown in (4):

(4) /sia^{52}/ 'to be bad' /biaŋ^{23}/ 'cheek'

/lian^{21}/ 'to be wealthy' /jial^{44}/ 'floor'

The back diphthong /ua/ is an opening diphthong starting from a close back rounded vowel position to an open central vowel position. Examples of back diphthongs are shown in (5).

(5) /kua^{21}/ 'hole' /rua^{23}/ 'bamboo'

/suaŋ^{44}/ 'to cook' /tsuap^{52}/ 'lung'

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2.2.1 Vowel contrasts

Evidences for vowel contrasts are provided below.

/i/ : /ɛ/

CIE #482 /t̪il^{44}/ 'scrotum'

#483 /t̪ɛl^{44}/ 'to participate'

CIE #484 /iɾ^{23}/ 'upper throat'

#485 /ɛɾ^{23}/ 'to make, to mold'

CIE #486 /kiɾ^{44}/ 'to be curled'

#195 /kɛɾ^{44}/ 'clothes'

CNE #259 /tiʔ^{21}/ 'to be afraid'

#274 /fɛʔ^{21}/ 'to go'

CNE #487 /sin^{52}/ 'to apply (blanket)'

#364 /sɛn^{23}/ 'to be red'

/a/ : /ɔ/

CIE #391 /tsak^{21}/ 'to be strong'

#488 /tsɔk^{21}/ 'to mingle, to mix'

CIE #377 /t̪^{h}ak^{21}/ 'to be spicy'

#489 /t̪^{h}ɔk^{21}/ 'to start'

CIE #196 /t̪aʔ^{21}/ 'to weave'

#490 /t̪ɔʔ^{21}/ 'key'

/u/ : /ɔ/

CIE #493 /t̪uŋ^{23}/ 'to (make) stand upright'

#492 /t̪ɔŋ^{23}/ 'to meet'

CIE #494 /k^{h}up^{21}/ 'to put upside down'

#495 /k^{h}ɔp^{21}/ 'to be enough'

CIE #141 /luŋ^{23}/ 'heart'

#516 /lɔŋ^{23}/ 'to take over'

2.2.2 Allophonic variation of vowels

The high front vowel [e] always occurs before the glide /j/ but it appears as [ɛ] in all other environments as in (6). The two phones are in complementary distribution and are phonetically similar, and they are called variants or allophones of the same phoneme.

(6) **Allophonic rule**: /ɛ/ → [e] / ___ j

/p^{h}ɛɾ^{23}/ 'mat' → [p^{h}ej^{23}] 'to go straight forwards'

/kɛɛw^{52}/ 'to bite' → [kej^{44}] 'I'

/t̪^{h}ɛʔ^{21}/ 'to sprinkle' → [t̪^{h}ej^{21}] 'to hear'

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The central vowel /a/ is realized as [ə] when it is short and followed by /w/; therefore, the segment [ə] is analyzed as an allophone of the phoneme /a/ as in (7):

(7) **Allophonic rule**: /a/ → [ə] /___ w

/laaw^{44}/ 'to be wild' → [ləw^{44}] 'field, farm'

/t̪^{h}aaw^{23}/ 'to be fat' → [səw^{23}] 'to be boiled'

/kaaw^{21}/ 'to be wide' → [kəw^{23}] 'to call'

The occurrence of [ə] is very limited as in (7) and the phoneme /a/ appears in all other environments like [lan^{52}] 'to overcome, to jump over', [tap^{21}] 'to cry', [haj^{23}] ' to be wanted, to be needed', and [tam^{44}] 'to be many'. In both of these rules a vowel which is not a back vowel becomes raised slightly preceding a semivowel, which in Falam always high.

2.2.4 Nasalization

Nasalized vowels are not phonemic in Falam. Vowels are nasalized when they occur after and between nasal consonants as seen in (8):

(8) V → [+nasal]/ $C_{[+nasal]}$ ___ $C_{[+nasal]}$

[nĩĩ^{23}] 'sun' [mĩĩ^{52}] 'person'

[ŋãã^{52}] 'fish' [mãn^{52}] 'to be free or to be ready'

[ŋũũn^{23}] 'silver' [mũũ^{52}] 'seed'

[ŋõõŋ^{23}] 'neck' [nãŋ^{44}] 'you (2s)'

The derivation rule for nasalization can be drawn as below:

Underlying Form:	{vaan^{21}} 'sky'	{nii^{23}} 'to laugh'
Nasalization Rule:	vaan^{21}	nĩĩ^{23}
Surface Form:	[vaan^{21}]	[nĩĩ^{23}]

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