Malayic varieties of Kelantan and Terengganu: description and linguistic history

Wu, J.

CHAPTER 2

Phonology of Kelantan Malay

2.1 Introduction

This chapter describes the phonology of KM, covering an examination of the segment inventory in §2.2, syllable structure in §2.3 and word structure in §2.4. Phonotactic constraints on permitted consonant clusters, consonant sequences and vowel sequences are presented in §2.5 to §2.7. The stress pattern is discussed in §2.8, and a summary is provided in §2.9.

2.2 Segment inventory

2.2.1 Consonant system

2.2.1.1 Consonant inventory

Table 2.1 displays the consonant inventory of KM, which consists of twenty native consonant phonemes including seven stops, four nasals, three fricatives, two affricates, two liquids and two glides. Two borrowed consonants with marginal phonemic status are also included in the table, enclosed in parentheses.

Table 2.1: Consonant inventory of KM

		Labial	Dental	Alveolar	Palatal	Velar	Glottal
Stops	voiceless	p	t			k	ʔ
	voiced	b		d		g	
Nasals		m		n	ɲ	ŋ	
Fricatives	voiceless			s		x	h
	voiced			(z)			
Affricates	voiceless				c		
	voiced				j		
Liquids				l, (ɾ)		ɣ	
Glides		w			y		

(c = IPA /c͡ç/, j = IPA /ɟ͡ʝ/, y = IPA /j/)

Among the stops, the voiceless coronal stop is articulated as dental [t̪], whereas its voiced counterpart is articulated as alveolar [d]. This asymmetry in the place of articulation of /t/ and /d/, sometimes labelled as dental discrepancy, is also present in SM and many other Austronesian languages (Henderson 1965: 420–421; Adelaar 1983; Donohue 2009). The palatal obstruents /c/ and /j/, while articulated as affricates, share similar phonological properties with the three sets of non-glottal stops. Therefore, for the purposes of this description, the term "stop" (in the phonemic sense) includes these two affricates. Non-glottal stops have similar distributions, and they exhibit similar patterns in possible combinations with other segments in consonant clusters and sequences (see §2.4.3, §2.5 and §2.6). The phoneme /ɣ/, which is phonetically a voiced velar fricative, is treated as a liquid for two reasons. First, language internal evidence suggests that /ɣ/ patterns with the lateral liquid /l/ in the formation of consonant clusters (see §2.5). Second, /ɣ/ often corresponds to an alveolar tap /ɾ/ (or a trill /r/) in other Malayic varieties (Adelaar 1992: 8).

While most loanwords have been adapted to KM phonology, some retained an unadapted pronunciation. Table 2.2 provides examples of words that contain the borrowed consonants /z/ and /ɾ/ (sometimes realised as a trill [r]).

Table 2.2: Examples of KM words with borrowed consonants

Phoneme	Example	Gloss	Origin
/z/	/**z**ina/	'adultery'	< Arabic *zinā'* [10]
	/u**z**o/	'weak'	< Arabic *ʿudhr*
/ɾ/	/aɾnaʔ/	'rabbit'	< Arabic *arnab*
	/aɾti/	'meaning'	< Sanskrit *artha*

These words ultimately originate from Arabic or Sanskrit. However, most loanwords from these languages (also later Portuguese) have been fully adapted to KM phonology, reflecting regular sound changes because of their long history. Words with unadapted foreign sounds thus likely entered KM more recently, presumably via SM *zina*, *uzur*, *arnab* and *ərti~arti* with the same meanings. The alveolar tap /ɾ/ is also found in English loanwords such as /ɔɾɛŋ/ 'orange', /gɾuʔ/ 'group' and /tɾa/ 'to try'.

The voiceless velar fricative /x/ also occurs in unadapted Arabic loanwords such as /axe/ 'end' < *ākhir*. However, most instances of /x/ do not reflect an unadapted pronunciation but rather result from the regular sound change /xx/ < *kɣ, e.g., /**xx**ɛtɔ/ 'car' < $^{+}$**kɣ**ɛtɔ < SM ***kərɛta*** < Portuguese *carreta* and /**xx**usi/ 'chair' < $^{+}$**kɣ**usi < SM ***kərusi*** < Arabic *kursī*. Therefore, I take /x/ as a native phoneme. See more discussion in §7.5.2.3.

2.2.1.2 Contrasts between consonants

Table 2.3 lists minimal or near-minimal pairs demonstrating the contrasts between similar consonants in KM. When no (near-)minimal pairs are found, the closest pair with contrasting segments is given. Contrasts in word-initial, -medial and -final positions are distinguished on account of the restricted distribution of some consonants. For instance, the velar nasal /ŋ/, the glottal fricative /h/ and the glides almost never occur in initial position. The glottal stop is not phonemic word-initially, and /x/ only appears in the geminated form /xx/. Word-finally, only /ʔ, ŋ, h/ are allowed. See more on consonant distributions in §2.4.3.1.

[10] Unless otherwise noted, the origins of loanwords are cited from Jones (2007).

Table 2.3: Contrasts between consonants in KM

Contrast	Pair	Gloss
Word-initially		
/p/ - /b/	/**p**uloh/	'ten'
	/**b**uloh/	'bamboo'
/b/ - /m/	/**b**ukɔ/	'to open'
	/**m**ukɔ/	'face'
/t/ - /d/	/**t**əbu/	'sugarcane'
	/**d**əbu/	'dust'
/d/ - /n/	/**d**ai/	'forehead'
	/**n**aiʔ/	'to climb, to go up; to ride'
/c/ - /j/	/**c**aɣi/	'to search'
	/**j**aɣi/	'finger'
/j/ - /ɲ/	/**j**awɔ/	'Java'
	/**ɲ**awɔ/	'soul'
/k/ - /g/	/**k**ali/	'times'
	/**g**ali/	'to dig'
/g/ - /ɣ/	/**g**ayɔ/	'to persuade'
	/**ɣ**ayɔ/	'Eid al-Fitr'
/m/ - /n/ - /ɲ/	/**m**amɔh/	'to chew'
	/**n**amɔ/	'name'
	/**ɲ**amoʔ/	'mosquito'
/n/ - /s/	/**n**iyaʔ/	'aim'
	/**s**iyaʔ/	'finished'
/l/ - /n/	/**l**amɔ/	'long (time)'
	/**n**amɔ/	'name'
/l/ - /ɣ/	/**l**ata/	'floor'
	/**ɣ**ata/	'necklace'
Word-medially		
/p/ - /b/	/lɛ**p**a/	'to throw'
	/lɛ**b**a/	'wide'
/b/ - /m/	/tə**b**u/	'sugarcane'
	/tə**m**u/	'to meet'
/t/ - /d/	/u**t**ɛ/	'forest; debt'
	/u**d**ɛ/	'shrimp'

Contrast	Pair	Gloss
/d/ - /n/	/kə**d**a/	'shop'
	/kə**n**a/	'to know'
/c/ - /j/	/a**c**a/	'pickles'
	/a**j**a/	'to teach'
/j/ - /ɲ/	/sə**j**aʔ/	'to toast'
	/sə**ɲ**aʔ/	'quiet'
/k/ - /g/ - /ŋ/	/i**k**aʔ/	'to tie up'
	/i**g**aʔ/	'to catch'
	/i**ŋ**aʔ/	'to think'
/g/ - /ɣ/	/la**g**i/	'again; more; still; yet'
	/la**ɣ**i/	'to run'
/m/ - /n/ - /ŋ/	/ta**m**ɛ/	'park'
	/ta**n**ɛ/	'to plant'
	/ta**ŋ**ɛ/	'hand'
/m/ - /ɲ/	/bu**m**i/	'earth'
	/bu**ɲ**i/	'sound'
/ɲ/ - /ŋ/	/a**ɲ**iŋ/	'dog'
	/a**ŋ**iŋ/	'wind'
/l/ - /n/	/bu**l**oh/	'bamboo'
	/bu**n**oh/	'to kill'
/l/ - /ɣ/	/ja**l**ɛ/	'road'
	/ja**ɣ**ɛ/	'seldom'
/s/ - /h/	/a**s**aʔ/	'smoke'
	/a**h**aʔ/	'Sunday'
/y/ - /w/	/a**y**ɛ/	'chicken'
	/a**w**ɛ/	'cloud'
Word-finally		
/ʔ/ - Ø	/susu**ʔ**/	'to hide'
	/susu/	'milk'
/ŋ/ - Ø	/pəti**ŋ**/	'important'
	/pəti/	'box'
/h/ - Ø	/sɔɣɔ**h**/	'drawer'
	/sɔɣɔ/	'voice'
/ʔ/ - /ŋ/	/lao**ʔ**/	'sea'
	/lao**ŋ**/	'to call'

Contrast	Pair	Gloss
/ʔ/ - /h/	/bɔwɔ**ʔ**/	'to bring'
	/bɔwɔ**h**/	'bottom; below'
/ŋ/ - /h/	/tujo**ŋ**/	'to jump down'
	/tujo**h**/	'seven'

A special type of contrasts is found between singleton and geminate consonants in word-initial position, as demonstrated by (near-)minimal pairs in Table 2.4.

Table 2.4: Contrasts between singletons and geminates in KM

Contrast	Pair	Gloss
/p/ - /pp/	/**p**alɔ/	'nutmeg'
	/**pp**alɔ/	'head'
/b/ - /bb/	/**b**iniŋ/	'wife'
	/**bb**iniŋ/	'to marry (a wife)'
/t/ - /tt/	/**t**upaʔ/	'compact; Tumpat (toponym)'
	/**tt**upaʔ/	'ketupat (k.o. rice cake)'
/d/ - /dd/	/**d**əɣah/	'loud; fast'
	/**dd**əɣah/	'to raise (voice)'
/c/ - /cc/	/**c**aɣɔ/	'method'
	/**cc**aɣɔ/	'to talk'
/j/ - /jj/	/**j**alɛ/	'road'
	/**jj**alɛ/	'to walk'
/k/ - /kk/	/**k**ulaʔ/	'mushroom; mould'
	/**kk**ulaʔ/	'mouldy'
/g/ - /gg/	/**g**aji/	'wage'
	/**gg**aji/	'saw (n.)'
/m/ - /mm/	/**m**aɣi/	'to come'
	/**mm**aɣi/	'cupboard'
/n/ - /nn/	/**n**akɔ/	'jackfruit'
	/**nn**aɣɔ/	'tower; Narathiwat (toponym)'
/ɲ/ - /ɲɲ/	/**ɲ**awɔ/	'soul, life'
	/**ɲɲ**awɔ/	'to breathe'

Contrast	Pair	Gloss
/s/ - /ss/	/**s**iyɛ/	'daytime'
	/**ss**iyɛ/	'to pity'
/l/ - /ll/	/**l**umaʔ/	'crushed'
	/**ll**umaʔ/	'to crush'
/ɣ/ - /ɣɣ/	/**ɣ**ɛhɛ/	'jaw'
	/**ɣɣ**ɛhɛ/	'molar tooth'

Word-initial geminates are cross-linguistically rare (Thurgood 1993; Muller 2001; Kraehenmann 2011). In KM, however, all consonants except for the glottals /h, ʔ/ and the glides /w, y/ can appear as geminates, and they only occur word-initially. The exclusive occurrence of geminates in word-initial position has a diachronic explanation, as they typically originate from the reduction of antepenultimate vowels in trisyllabic words and subsequent assimilation of initial clusters (compare KM /**pp**alɔ/ 'head' and /**ɣɣ**ɛhɛ/ 'molar tooth' with SM cognates ***k*ə*p*ala** and ***g*ə*r*aham**). A more detailed analysis of the origin of geminates is presented in §7.5.2. At the phonetic level, the distinction between singleton-geminate pairs in KM is predominantly reflected in the length of initial consonants, that is, geminate consonants have longer closure duration (Mohd Hilmi et al. 2016). Mohd Hilmi et al. (2018) further show a number of non-durational acoustic parameters where geminates and singletons differ: geminates are associated with shorter post-consonantal vowel duration, greater amplitude and higher fundamental frequency in the early part of the following vowel. At the phonological level, geminates are analysed as a subtype of consonant clusters instead of a separate series of phonemes, as supported by the variation attested between some geminates and non-geminate clusters; see more discussion on syllable structure in §2.3, and on consonant clusters in §2.5.

Note that not all geminates can be clearly contrasted with a corresponding singleton. For instance, the velar nasal occurs in the geminated form /ŋŋ-/, as in /ŋŋale/ 'to flow' and /ŋŋuwaʔ/ 'to yawn', whereas a singleton /ŋ/ rarely occurs initially (except in one instance /ŋaŋɔ/ 'to open wide'). Despite the lack of near-minimal pairs contrasting /ŋ/ and /ŋŋ/, the analysis of a geminate /ŋŋ-/ is on the ground that it has a duration comparable to other geminate nasals. Diachronically, it also originates from the assimilation of earlier clusters consisting of two segments, just as other geminates (com-

pare KM /ŋŋale/ 'to flow' with SM ***məŋ**alir*). For similar reasons, the status of /xx/ is maintained despite the lack of pairs contrasting /xx/ and /x/.

Many pairs contrasting an initial singleton and an initial geminate are semantically related. This is because some geminates can be analysed as morphologically complex, and initial gemination can be considered a morphophonological process with various functions; see §5.3.2.

2.2.1.3 Phonetic realisations of consonants

Some consonant phonemes in KM have variable realisations at the phonetic level, as summarised in Table 2.5 and explained below.

Table 2.5: Phonetic realisations of some consonant phonemes in KM

Phoneme	Realisation	Environment	Example		Gloss
/h/	[ç]~[h]	i__#	/nipi**h**/	[nipi**ç**]~[nipi**h**]	'thin'
			/kudi**h**/	[kudi**ç**]~[kudi**h**]	'scabies'
	[h]	elsewhere	/kabu**h**/	[kabu**h**]	'fog'
			/ata**h**/	[ata**h**]	'top'
/x/	[xx]~[kk]	#__	/**xx**usi/	[**xx**usi]~[**kk**usi]	'chair'
			/**xx**ɛtɔ/	[**xx**ɛtɔ]~[**kk**ɛtɔ]	'car'

First, the glottal fricative /h/ is often realised as a palatal fricative [ç] in word-final position after a high front vowel /i/, resulting from the coarticulation with the labial compression of that vowel (cf. Japanese /hi/ → [çi]). /nipih/ 'thin' can be articulated as [nipiç]~[nipih], and /kudih/ 'scabies' as [kudiç]~[kudih]. Elsewhere /h/ is realised as [h].

Second, the voiceless velar fricative /x/, which only occurs in the geminated form /xx/, has a phonetic realisation varying from [x] to [k] in word-initial position. For instance, /xxusi/ 'chair' is pronounced as [xxusi]~[kkusi], and /xxɛtɔ/ 'car' as [xxɛtɔ]~[kkɛtɔ], depending on the speaker. Given that phonemic /kk/ also occurs initially, the contrast between /xx/ and /kk/ in this position is sometimes neutralised. However, it does not mean that the two phonemes are in free variation: phonemic /xx/ can be pronounced as [kk], but conversely, phonemic /kk/ is never realised as [xx]. The phonemic status of /x/ is therefore maintained.

2.2.2 Vowel system

2.2.2.1 Vowel inventory

KM has twelve phonemic vowels, as presented in Table 2.6.

Table 2.6: Vowel inventory of KM

	Front	Central	Back
High	i		u, ũ
Mid-high	e		o
Mid-low	ɛ, ɛ̃	ə	ɔ, ɔ̃
Low		a, ã	

There are eight oral vowels and four nasal vowels, and a four-way distinction is made as regards vowel height. The high back vowel /u/, mid-low vowels /ɛ, ɔ/, and the low vowel /a/ have nasal counterparts, which yields a vowel inventory that is larger than many other Malayic varieties (cf. Adelaar 2005c; McDonnell et al. in print). Nasal vowels have limited presence and a restricted distribution, and their functional load seems to be light. Nevertheless, contrasts between a nasal vowel and its oral counterpart can be found in (near-)minimal pairs, see Table 2.8 below. /ĩ, ẽ, õ/ are also included as phonemes in earlier descriptions (e.g., Abdul Hamid 1994), in which the authors argue that these nasal vowels originated from the loss of final nasals and regressive nasalisation, as in /kucĩ/ 'cat' and /ɣacõ/ 'poison' (cf. SM *kuciŋ* and *racun*, also see a summary in Adelaar 2005c). /ẽ/ is transcribed ambiguously in Abdul Hamid's description. Based on my data, however, final nasals are retained in /kuciŋ/ 'cat' and /ɣacoŋ/ 'poison', and no phonemic /ĩ, ẽ, õ/ are attested.

A distinction needs to be made between nasalised vowels and true nasal vowels. Vowel nasality at the phonetic level is common in KM, as nasal consonants spread the feature of nasality rightwards, affecting adjacent vowels. For instance, /makɛ/ 'to eat' and /namɔ/ 'name' are realised as [mãkɛ] and [nãmɔ̃] respectively. Nasality can also spread over glides /w, y/ and glottals /h, ʔ/, affecting more than one vowel: /ɲɲawɔ/ 'to breathe' is realised as [ɲɲãwɔ̃], and /maha/ 'expensive' as [mãhã]. In these cases, the vowels carrying nasality are considered nasalised vowels, which are allophonic

realisations of oral vowels following nasals.[11] However, there are also cases where vowels show nasality independent of nasal consonants, e.g., [ɛ̃] in [kəcɛ̃ʔ] 'small' and [ũ] in [busũʔ] 'smelly'. These vowels are taken as true, phonemic nasal vowels. In a few examples such as [jmãʔãʔ]~[mmãʔãʔ] 'Friday' and [mãʔãh] 'sorry' (< Arabic *jumʿa* and *muʿāf*, cf. SM *jumaat* and *maaf*), it is ambiguous whether the final-syllable [ã] is phonemically nasal or not. On the one hand, final-syllable [ã] in these examples may be seen as resulting from nasal spreading, but on the other hand, Arabic loanwords with similar shapes often evidently have nasal vowels, as in /saʔãʔ/ 'second' and /tɔʔãʔ/ 'devotion' (< *sāʿa* and *ṭāʿa*, cf. SM *saat* and *taat*).[12] I consider the second observation more important and opt for the transcription of /jmaʔãʔ/~/mmaʔãʔ/ 'Friday' and /maʔãh/ 'sorry'.

KM does not have phonemic diphthongs. Vowel sequences constitute two syllables. For instance, /bau/ 'shoulder; smell' is disyllabic, articulated as [ba.u], and /ae/ 'water' is articulated as [a.e]. More discussion on vowel sequences is provided in §2.7.

2.2.2.2 Contrasts between vowels

The phonemic status of KM vowels is demonstrated by minimal or near-minimal pairs presented in Table 2.7 and Table 2.8. Contrasts found in penultimate and final syllables are distinguished in view of the canonical disyllabic word structure and the restricted distribution of some vowels at the word level, see §2.4.3.2.

[11] Similar progressive vowel nasalisation and nasal spreading is reported in SM (Farid 1976: 70) and in Salako (Adelaar 2005b: 23).

[12] It appears that in the borrowing of Arabic loanwords, the original voiced pharyngeal fricative /ʕ/ (transliterated as ⟨ʿ⟩) typically has an effect on nasalising the following vowel. See more discussion in §7.4.3.

Table 2.7: Contrasts between oral vowels in KM

Contrast	Pair	Gloss
Penultimate syllables		
/a/ - /i/	/b**a**tɛ/	'stem'
	/b**i**tɛ/	'star'
/a/ - /u/ - /ɛ/	/m**a**ɣɔh/	'angry'
	/m**u**ɣɔh/	'cheap'
	/mɛɣɔh/	'red'
/a/ - /ɔ/	/k**a**li/	'times'
	/kɔli/	'wok'
/a/ - /ə/	/p**a**ɣɛ/	'machete'
	/pəɣɛ/	'war'
/i/ - /u/	/t**i**kɛ/	'to stab'
	/t**u**kɛ/	'expert'
/i/ - /ɛ/	/b**i**sɔ/	'poisonous'
	/bɛsɔ/	'usual'
/i/ - /ɔ/	/l**i**paʔ/	'to fold'
	/lɔpaʔ/	'to jump'
/i/ - /ə/	/p**i**sɛ/	'banana'
	/pəsɛ/	'to order'
/u/ - /ɔ/	/b**u**tɔ/	'blind'
	/bɔtɔ/	'bottle'
/u/ - /ə/	/m**u**tɔh/	'to vomit'
	/mətɔh/	'raw'
/ɛ/ - /ɔ/	/bɛwɔʔ/	'monitor lizard'
	/bɔwɔʔ/	'to bring'
/ɛ/ - /ə/	/mɛnɛ/	'toy, game'
	/mənɛ/	'to win'
/ɔ/ - /ə/	/sɔɣɔh/	'drawer'
	/səɣɔh/	'to surrender'
Final syllables		
/a/ - /i/ - /u/ - /o/	/at**a**/	'to send'
	/at**i**/	'liver'
	/at**u**/	'ghost'
	/at**o**/	'to arrange'

Contrast	Pair	Gloss
/a/ - /ɔ/	/sap**a**/	'until'
	/sap**ɔ**/	'who'
/a/ - /ɛ/	/lap**a**/	'hungry'
	/lap**ɛ**/	'eight'
/a/ - /e/	/al**a**ʔ/	'tool'
	/al**e**ʔ/	'direction'
/i/ - /ɛ/	/pad**i**/	'paddy'
	/pad**ɛ**/	'field'
/i/ - /ɔ/	/mat**i**/	'to die'
	/mat**ɔ**/	'eye'
/i/ - /e/	/gal**i**/	'to dig'
	/gal**e**/	'loose'
/u/ - /ɔ/	/buk**u**/	'book'
	/buk**ɔ**/	'to open'
/u/ - /e/	/pas**u**/	'flower pot'
	/pas**e**/	'sand'
/u/ - /ɛ/	/baɣ**u**/	'new; have just'
	/baɣ**ɛ**/	'stuff'
/ɛ/ - /ɔ/	/paɣ**ɛ**/	'machete'
	/paɣ**ɔ**/	'rack'
/ɛ/ - /o/	/say**ɛ**/	'to love'
	/say**o**/	'vegetable'
/ɛ/ - /e/	/il**ɛ**/	'lost'
	/il**e**/	'downstream'
/ɔ/ - /e/	/but**ɔ**/	'blind'
	/but**e**/	'grain; CLF'
/ɔ/ - /o/	/mas**ɔ**ʔ/	'ripe'
	/mas**o**ʔ/	'to enter'
/e/ - /o/	/bul**e**h/	'can; to get'
	/bul**o**h/	'bamboo'

Contrasts between oral and nasal vowels are displayed in Table 2.8. Such contrasts are only found in final syllables.

Table 2.8: Contrasts between oral and nasal vowels in KM

Contrast	Pair	Gloss
/a/ - /ã/	/buwaʔ/	'to do; to make'
	/puwãʔ/	'to brush (hair)'
/ɛ/ - /ɛ̃/	/kɛcɛʔ/	'to speak'
	/kəcɛ̃ʔ/	'small'
/ɔ/ - /ɔ̃/	/ɛsɔʔ/	'tomorrow'
	/ɛsɔ̃ʔ/	'to scoot over'
/u/ - /ũ/	/busuʔ/	'ant hill'
	/busũʔ/	'smelly'

2.3 Syllable structure

Syllables in KM have a template of (C)(C)V(C), with an optional onset and an optional coda. A nucleus V is always a monophthong without length distinction. An onset can be a consonant cluster consisting of two consonants, whereas a coda can only have one segment. Table 2.9 offers an overview of permitted syllable types.

Table 2.9: Overview of syllable types in KM

Onset	Nucleus	Coda
	V	
	V	C
C	V	
C	V	C
CC	V	
CC	V	C

The distribution of single consonants at the syllable level is summarised in Table 2.10. A plus sign marks a position where a phoneme is attested, and a minus sign marks a position where a phoneme is not attested. A plus

sign between parentheses indicates that the segment has restricted occurrences in that position. Unusual distributions of segments in identifiable loanwords are not taken into account.

Table 2.10: Distribution of consonants in KM at the syllable level

Position	p	b	t	d	c	j	k	g	ʔ	m	n	ɲ	ŋ	s	x	h	l	ɣ	w	y
onset	+	+	+	+	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	+
coda	-	-	-	-	-	-	-	-	+	(+)	(+)	(+)	+	-	-	+	-	-	-	-

(+ : attested, - : not attested, (+) : attested but restricted)

A single segment in onset position can be any consonant except for the glottal stop /ʔ/ and the velar fricative /x/, whereas in coda position, only the nasals and the glottals /ʔ, h/ are permitted.[13] The distribution of /x/ is highly restricted; as mentioned earlier, /x/ only appears in the geminated form /xx/ in word-initial onset position. The bilabial, alveolar and palatal nasals /m, n, ɲ/ may occur as a coda, but only when followed by a homorganic voiced obstruent, that is, they only appear in homorganic nasal + voiced obstruent sequences /-m.b-, -n.d-, -ɲ.j-/ in word-medial position. The velar nasal /ŋ/, on the other hand, appears in the consonant sequence /-ŋ.g-/ and in word-final position (see §2.4.3.1).[14]

Complex onsets CC are consonant clusters in the sense that the two consonants belong to the same syllable. They cannot be analysed as consonant sequences that fall into two syllables as they typically occur word-initially, and there is no evidence for syllabic consonants. CC clusters can contain either two identical segments C_xC_x or two dissimilar segments C_xC_y, which I call "geminate clusters" and "non-geminate clusters" respectively. Phonetically, geminate clusters are realised as single long units; phonologically, they are taken as a type of clusters on account of some variation attested between a form with a geminate cluster and a form with a non-geminate cluster,

[13] An initial glottal stop at the phonetic level is always present in vowel-initial words, but there is no contrast between initial [ʔ] and Ø at the phonemic level. A phonemic glottal stop also occurs word-medially as the onset of the final syllable, but it is exclusively attested in loanwords, e.g., /jmaʔãʔ/~/mmaʔãʔ/ 'Friday' and /maʔãh/ 'sorry', as cited previously.

[14] Nasal codas may be represented by an archiphoneme /N/. In word-medial position, the realisation of /N/ shares the same place feature of the following obstruent, and in word-final position, it is realised as a velar nasal [ŋ].

e.g., /tliŋɔ/~/lliŋɔ/ 'ear', /kmaɣiŋ/~/mmaɣiŋ/ 'yesterday' and /jnɛlɔ/~/nnɛlɔ/ 'window'. Attested complex onsets CC are presented in §2.5.

The distribution of oral vowels at the syllable level is summarised in Table 2.11. There are only few constraints.

Table 2.11: Distribution of oral vowels in KM at the syllable level

Syllable type	a	i	u	ɛ	ɔ	e	o	ə
V	+	+	+	+	+	+	+	-
VC	+	+	+	+	+	+	+	-
CV	+	+	+	+	+	+	+	+
CVC	+	+	+	+	+	+	+	+
CCV	+	+	+	+	+	-	-	+
CCVC	+	+	+	+	+	-	-	+

(+ : attested, - : not attested)

First, the schwa /ə/ is not allowed in onsetless syllables (V or VC); in other words, it does not occur initially in a syllable. All other oral vowels can be preceded by an onset and/or followed by a coda. Second, the mid-high vowels /e, o/ are not attested in syllables with a complex onset. This is because in words with a canonical disyllabic shape, /e, o/ only appear in final syllables, whereas syllables with a complex onset only occur in penultimate position (see §2.4.3.2).

The distribution of nasal vowels cannot be summarised in full details given the limited number of instances, but based on what can be observed, nasal vowels typically occur in syllables with a CVC shape where the coda C is a glottal stop /ʔ/. Some examples have been presented in Table 2.8. Some loanwords, function words, ideophones and interjections display a deviant pattern, where a nasal vowel appears in open syllables, as in the following examples: /dɔʔɔ̃/ 'to pray' (< Arabic *duʿāʾ*, cf. SM *doa*), /hɔ̃/ 'AFF', /cã/ 'sound of water ejection', and /wã/, which is an interjection used when one notices something smelly. /ɛ̃/ in /matɔ kaɛ̃/ 'fish hook' is another exception.

2.4 Word structure

In describing word structure, it is necessary to make the distinction between simple words and complex words. A morphologically simple word consists of one morpheme, whereas a complex word is made up of more than one morpheme. Complex words can be affixed forms, which I refer to as "derivatives", compounds or reduplicated forms. For a more detailed description of the morphological system, see Chapter 5.

In this section, I first describe the word shapes of simple words and derivatives separately in §2.4.1 and §2.4.2. As will be shown, despite having different morphological structures, simple words and derivatives share a close similarity in their word shapes with a strong preference for disyllabicity. In §2.4.3, I summarise the phoneme distributions at the word level, which hold for both simple words and derivatives.

2.4.1 Structure of simple words

Simple words in KM are typically disyllabic, but they can also contain one syllable or more than two syllables.

Monosyllabic simple words appear in a (C)(C)V(C) template, with minimally a vowel as the nucleus. Some examples are presented in Table 2.12.

Table 2.12: Monosyllabic simple words in KM

Syllable type	Example	Gloss
V	/a/	'INTERJ'
VC	/eh/	'INTERJ'
CV	/ɲɔ/	'coconut'
CVC	/moŋ/	'2SG'
CCV	/nnɛ/	'six'
CCVC	/mmah/	'gold'

While some monosyllabic content words can be found, monosyllables are more often function words, e.g., the personal pronoun /moŋ/ '2SG', prepositions such as /kɔ/ 'to; AGT' and /di/ 'LOC', and demonstratives /ni/ 'DEM.PROX'

and /tu/ 'DEM.DIST'. Monosyllables with an initial vowel are exclusively interjections. Also note that monosyllables with a CCV or CCVC shape typically have a geminate cluster in onset position, except in cases like /mbuh/ 'to blow', /mboŋ/ 'dew' and /ŋgɛ/ 'hornbill', which have an initial cluster consisting of a nasal and a homorganic stop.[15]

The majority of KM simple words are disyllabic with a (C)(C)V(C).(C)V(C) template, which is built upon two of the six possible syllable types presented in Table 2.9. One restriction on such combinations of two syllables is that syllables with a complex onset can only be word-initial. All other logical combinations of two syllables except for ˣV.VC and ˣCCV.VC are attested and illustrated by the examples in Table 2.13.

Table 2.13: Disyllabic simple words in KM

Syllable type	Example	Gloss
V.V	/a.e/	'water'
V.CV	/a.ti/	'liver'
V.CVC	/i.doʔ/	'to live'
VC.CV	/am.bɔ/	'1SG (polite)'
VC.CVC	/am.biʔ/	'to take'
CV.V	/ba.u/	'shoulder; smell'
CV.VC	/ta.oŋ/	'year'

[15] The analysis of geminate onset clusters in monosyllabic words is not beyond dispute. A few important observations may be laid out here. First, pairs contrasting a singleton C and a geminate CC are not attested in monosyllabic words. Second, monosyllabic content words are always pronounced with initial geminates in careful speech and in isolation (typically in word list elicitation), e.g., [ɲɲɔ] 'coconut', [mmɔʔ] 'mother', [ppaʔ] 'four' and [nnɛ] 'six'. A preliminary examination suggests that the length of initial consonants in these words and the proportion of the consonant duration in the whole syllable are comparable to a typical geminate found in disyllabic words. Third, in natural and connected speech, some monosyllabic content words are consistently pronounced with a geminate, e.g., [ppaʔ] 'four' in [duwɔ puloh ppaʔ] 'twenty four' and [mmah] 'gold' in [pase mmah] 'Pasir Mas (toponym)', whereas others are typically pronounced without a geminate, e.g., [ɲɔ] 'coconut' in [wɔhɲɔ] 'coconut (fruit)'. Based on these observations, I consider that only words consistently pronounced with a geminate have a underlying CCV or CCVC structure. This analysis is also supported diachronically, as monosyllables with a phonemic geminate originate from earlier disyllables with the loss of schwa in the penultimate syllable. Compare KM /ppaʔ/ 'four', /nnɛ/ 'six' and /mmah/ 'gold' with SM cognates *əmpat*, *ənam* and *əmas* (also see §7.5.1).

Syllable type	Example	Gloss
CV.CV	/ka.ki/	'leg; foot'
CV.CVC	/da.ɣɔh/	'blood'
CVC.CV	/paɲ.jɛ/	'long'
CVC.CVC	/puŋ.goŋ/	'buttocks'
CCV.V	/pɣa.u/	'canoe'
CCV.CV	/nna.tɛ/	'animal'
CCV.CVC	/ssə.kiŋ/	'poor'
CCVC.CV	/blaɲ.jɔ/	'expense; bride price'
CCVC.CVC	/ccam.bɔh/	'bean sprouts'

Both geminate clusters and non-geminate clusters can be found as the initial CC onsets in disyllabic simple words. The template (C)(C)V(C).(C)V(C) also shows that a word-medial -C.C- consonant sequence is formed when the coda C of the penultimate syllable precedes the onset C of the final syllable. I use the term "consonant sequences" to refer to such strings of two adjacent consonants that are heterosyllabic, in contrast to "consonant clusters". Attested consonant sequences are discussed in §2.6.

Simple words with more than two syllables are rare, and most of them can be identified as loanwords. Some examples are given in Table 2.14.

Table 2.14: Simple words with more than two syllables in KM

Syllable type	Example	Gloss	Origin
V.CV.CV	/u.ta.ɣɔ/	'north'	< Sanskrit
V.CV.CVC	/ɔ.ga.niʔ/	'organic'	< English
CV.CV.CV	/ba.si.ka/	'bicycle'	< English
CVC.CV.CV	/pus.ta.kɔ/	'library'	< Sanskrit
CV.CV.CV.CVC	/ta.li.bi.siŋ/	'television'	< English

/utaɣɔ/ 'north' and /pustakɔ/ 'library' have their ultimate origin in Sanskrit, but they are likely to have been borrowed directly from SM *utara* and *pustaka*. /ɔganiʔ/ 'organic' and /basika/ 'bicycle' are loanwords from English, possibly via SM *organik* and *basikal*. The quadrisyllabic word /talibisiŋ/ 'television' is also borrowed from English. Some other trisyllabic simple words,

such as /bə.ka.li/ 'maybe' and /ha.li.yɔ/ 'ginger', do not have an obvious traceable foreign origin. However, irregular phonological patterns such as the unexpected initial /h/ in /haliyɔ/ 'ginger' (see §2.4.3.1) suggest that they too were borrowed.

2.4.2 Structure of derivatives

Derivatives are words that have an affix attached to a base form. As regards their word shapes, derivatives in KM have at least two syllables, and a preference for disyllabicity is also attested. Derivatives with more than two syllables are uncommon, and many of them can be arguably taken as loanwords.

Table 2.15 lists some examples of disyllabic derivatives in KM.

Table 2.15: Disyllabic derivatives in KM

Syllable type	Example	Morphological structure	Gloss	
CCV.V	/bɣa.e/	*bɣ-ae*	(INTR-water)	'watery'
CCV.VC	/ssa.iŋ/	*s-saiŋ*	(INTR-friend)	'to befriend'
CCV.CV	/bla.ɣi/	*b-laɣi*	(MID-run)	'to run'
CCV.CVC	/pɣa.bih/	*pɣ-abih*	(CAUS-finished)	'to finish'
CCVC.CV	/mman.di/	*m-mandi*	(CAUS-bath)	'to bath s.o.'
CCVC.CVC	/nnam.bɔh/	*NN$_1$-<t>ambɔh*[16]	(IPFV-add)	'adding'

As will be discussed in §5.3.1, KM only has a small number of affixes, all of which are prefixes, each consisting of two consonants. Given a base form with an initial vowel or a single consonant, prefixation does not add an extra syllable, but generates a disyllabic form with an initial CC cluster (see the morphophonological alternations of prefixes in §5.3.1.1). Importantly, all word shapes attested in disyllabic derivatives are also found in simple words, and the same maximal CCVC.CVC shape is shared.

[16] *NN-* stands for a geminate nasal prefix that undergoes morphophonological alternations of nasal assimilation and substitution depending on the base-initial segment, see §5.3.1.1. The angle brackets <> indicate the base-initial segment that is deleted during this morphophonological process.

Bases with initial CC clusters typically do not undergo prefixation, except in a few examples such as /bə.tɣa.bo/ *bə-tɣabo* (MID-scattered) 'cluttered', /bə.sɣa.buʔ/ *bə-sɣabuʔ* (MID-upset) 'upset' and /bə.glabɔh/ (MID-anxious) 'anxious', whereby prefixation results in trisyllabic derivatives. The bases in all these examples have non-geminate clusters, more specifically comprised of an obstruent followed by a liquid. Bases with initial geminate clusters are never prefixed.

Some trisyllabic words may be analysed as having a nominalising suffix *-ɛ*, as in the following examples:

(1)	/u.ku.mɛ/	*ukum-ɛ*	(penalise-NMLS)	'penalty'
	/ba.la.sɛ/	*balas-ɛ*	(reply-NMLS)	'reply'
	/ha.ɾa.pɛ/	*haɾap-ɛ*	(hope-NMLS)	'hope'
	/ki.sa.ɣɛ/	*kisar-ɛ*	(grind-NMLS)	'grinder'
	/kan.da.ɣɛ/	*kandar-ɛ*	(carry-NMLS)	'shoulder pole'

Nevertheless, the nominalising suffix *-ɛ* is not productive, and the bases ˣ*ukum-*, ˣ*balas-*, ˣ*harap-*, ˣ*kisar* and ˣ*kandar* are not synchronically attested (cf. *ukoŋ*, *balah*, *aɣaʔ*, *kisa* and *kanda*, which are attested verbs with the same meaning). Some of these forms also display unexpected sound patterns. For instance, /haɾapɛ/ 'hope' has an unexpected initial /h/ and a tap /ɾ/ (see §2.4.3.1). This raises questions about whether these trisyllabic derivatives are native at all, or possible borrowings from another Malayic variety.

Similarly, some quadrisyllabic words may be analysed as complex, formed with the circumfix *pə- -ɛ*, as shown in (2).

(2)	/pə.ja.lɛ.nɛ/	*pə-jalɛ(n)-ɛ*	(NMLS-road-NMLS)	'journey'
	/pə.ɣu.mɔ.hɛ/	*pə-ɣumɔh-ɛ*	(NMLS-house-NMLS)	'household'
	/pə.jum.pə.ʔɛ/	*pə-jumpə(ʔ)-ɛ*	(NMLS-meet-NMLS)	'meeting'

Here too, there is evidence suggesting that these forms may not be inherited or synchronically derived. First, the circumfixing process is apparently not regular; for instance, /n/ in /jalɛ/ 'road' → /pəjalɛnɛ/ 'journey' is unexplained. Second, some words reveal unexpected sound patterns, such as the consonant sequence /-m.p-/ in /pəjumpəʔɛ/ 'meeting' (see §2.6). I consider words like /pəjumpəʔɛ/ as (nonce) borrowings, possibly from SM *pərjumpaan* (often pronounced as [pəjumpəʔan]) with the adaptation of *-an* to /-ɛ/.

The foregoing examination reveals that although the morphological structures of simple words and derivatives are fundamentally different,

there is a significant similarity in terms of their word shapes. As far as native words are concerned, both types of words exhibit a canonical disyllabic structure with a maximal CCVC.CVC shape. While some monosyllabic simple words and trisyllabic derivatives are allowed, the strong preference for disyllabicity is evident. It is also noteworthy that derivational processes typically do not form words exceeding the maximal disyllabic CCVC.CVC template. In fact, simple words and derivatives do not only share a disyllabic word shape; phonotactic constraints on the distribution of segments at the word level, permitted clusters and sequences, also apply to both simple words and derivatives. This uniformity finds its origin in diachronic processes, as the synchronic constraints are the manifestations of the same phonological changes that have affected both word types. See more in §7.5.2.

2.4.3 Phoneme distribution at the word level

The following phoneme distributions are summarised based on the canonical disyllabic template, with further consideration of monosyllables when relevant.

2.4.3.1 Distribution of consonants

Table 2.16 displays the distribution of single consonants at the word level. Distributional patterns of consonants in loanwords are excluded in the generalisation.

Table 2.16: Distribution of consonants in KM at the word level

Position	p	b	t	d	c	j	k	g	ʔ	m	n	ɲ	ŋ	s	x	h	l	ɣ	w	y
initial	+	+	+	+	+	+	+	+	-	+	+	+	(+)	+	-	(+)	+	+	(+)	(+)
medial	+	+	+	+	+	+	+	+	-	+	+	+	+	+	-	+	+	+	+	+
final	-	-	-	-	-	-	-	-	+	-	-	-	+	-	-	+	-	-	-	-

(+ : attested, - : not attested, (+) : attested but uncommon)

In word-initial position, the glottal stop is not phonemic. The velar fricative /x/ only appears in the geminated form /xx/; the single segment /x/ is also

not allowed in any other position in a word. The presence of /ŋ, h, w, y/ is uncommon. Initial /ŋ, w, y/ are mostly found in shortened variants of some disyllables, such as /ŋa/~/dəŋa/ 'with' (also /ŋɛ/~/dəŋɛ/ 'with'), /wi/~/buwi/ 'to give', /wɔh/~/buwɔh/ 'fruit', /waʔ/~/buwaʔ/ 'to do' and /ya/~/ɣiya/ 'ringgit (currency unit)'.[17] Initial /h/ is found in monosyllabic function words such as /hɔ̃/ 'AFF' and /hɔʔ/ 'REL'. In disyllabic words, initial /ŋ/ is attested in one instance /ŋaŋɔ/ 'to open wide', and /h/ occurs in few examples such as /hoŋga/ 'to run', /hambaʔ/ 'to chase' and /haga/ 'to throw'.[18]

Word-medially, the glottal stop /ʔ/ and the velar fricative /x/ are not allowed. A word-medial /h/ is usually found between alike vowels, e.g., /dɛhɛ/ 'branch', /pɔhɔ/ 'thigh', /pɔhoŋ/ 'tree' and /jahaʔ/ 'bad'. Some exceptions include /pahiʔ/ 'bitter' and /bɣəhi/~/bɣahi/ 'to like (very much); be addicted to'.

In word-final position, only three segments /ʔ, ŋ, h/ are permitted.

2.4.3.2 Distribution of vowels

The distribution of oral vowels at the word level is summarised in Table 2.17.

Table 2.17: Distribution of oral vowels in KM at the word level

Position	a	i	u	ɛ	ɔ	e	o	ə
penultimate	+	+	+	+	+	-	-	+
final	+	+	+	+	+	+	+	-

(+ : attested, - : not attested)

[17] The cognates of /buwɔh/ 'fruit' and /buwaʔ/ 'to do' and /ɣiya/ 'ringgit' in SM are *buah*, *buat* and *rial*, which are analysed as having vowel sequences /-u.a-/ or /-i.a-/. An intervocalic glide breaking up the sequence can sometimes be heard, but glides following a corresponding high vowel (i.e., /w/ following /u/ and /y/ following /i/) are considered non-phonemic (Adelaar 1992: 11). In KM, I treat intervocalic glides following high vowels as phonemic, supported by evidence from the preservation of glides in word-initial position in the shortened forms of disyllabic words, as demonstrated by the examples here. See more in §7.3.5.1.

[18] /hoŋga/ 'to run' appears to be a loanword with the unexpected occurrence of /o/ in the penultimate syllable (see §2.4.3.2). The word itself does not seem native Malayic, but the source is unknown. /hambaʔ/ 'to chase' and /haga/ 'to throw' may be native, but the occurrence of initial /h/ would be unexplained.

The mid-high vowels /e, o/ are not allowed in penultimate syllables. The schwa /ə/ only occurs in non-final syllables and syllables with an onset (§2.3), which means that it does not occur word-initially. Furthermore, among vowels that do appear in final syllables, only /i, e, o/ are allowed before final /ŋ/. Word-final ˣ/-aŋ/, ˣ/-ɛŋ/, ˣ/-ɔŋ/ and ˣ/-uŋ/ are not attested.

Nasal vowels are often attested in monosyllabic words or final syllables in disyllabic words. Some examples are given in Table 2.18.

Table 2.18: Words with nasal vowels in KM

Syllable type	Example	Gloss
monosyllabic	/hɔ̃/	'AFF'
	/sɔ̃ʔ/	'very attractive'
disyllabic	/ttu.wãʔ/	'wart'
	/kə.cɛ̃ʔ/	'small'
	/ɛ.sɔ̃ʔ/	'to scoot over'
	/bu.sũʔ/	'smelly'

2.5 Consonant clusters

Table 2.19 displays attested word-initial consonant clusters C_1C_2 in KM. C_1 is indicated on the left on the vertical line, and C_2 on the top on the horizontal line. Clusters enclosed in parentheses are uncommon, which may either appear as variants of other clusters or be restricted to loanwords.

With the exception of the glottals /h, ʔ/ and the palatal glide /y/, all consonants can occur in a consonant cluster, whether in a geminate cluster or a non-geminate cluster. Within non-geminate clusters, six types of clusters can be categorised based on their components: 1) obstruent + liquid; 2) obstruent + obstruent; 3) obstruent + nasal; 4) nasal + obstruent; 5) nasal + liquid; and 6) obstruent + glide. Each type is explained below, and examples are provided in (3) through (9).

Table 2.19: Attested consonant clusters in KM

C_1 \ C_2	p	b	t	d	c	j	k	g	m	n	ɲ	ŋ	s	x	l	ɣ	w
p	pp	-	-	pd	-	-	-	-	-	pn	-	-	-	-	pl	pɣ	-
b	-	bb	-	-	-	-	-	-	-	-	-	-	bs	-	bl	bɣ	-
t	-	tb	tt	-	-	tj	tk	tg	tm	-	-	-	-	-	tl	tɣ	(tw)
d	-	-	-	dd	-	-	-	-	-	-	-	-	-	-	(dl)	dɣ	-
c	cp	-	-	-	cc	-	-	-	cm	-	-	-	-	-	cl	cɣ	(cw)
j	-	-	-	-	-	jj	-	-	jm	jn	-	-	-	-	jl	jɣ	jw
k	-	kb	-	kd	-	-	kk	-	km	-	-	-	-	-	kl	-	(kw)
g	-	-	-	-	-	-	-	gg	gm	-	-	-	-	-	gl	(gɣ)	gw
m	-	mb	-	-	-	-	-	-	mm	-	-	-	-	-	ml	-	-
n	-	-	-	nd	-	-	-	-	-	nn	-	-	-	-	-	-	-
ɲ	-	-	-	-	-	-	-	-	-	-	ɲɲ	-	-	-	-	-	-
ŋ	-	-	-	-	-	-	-	ŋg	-	-	-	ŋŋ	-	-	-	-	-
s	sp	sb	st	sd	sc	sj	sk	sg	sm	sn	-	-	ss	-	sl	sɣ	-
x	-	-	-	-	-	-	-	-	-	-	-	-	-	xx	-	-	-
l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ll	-	-
ɣ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ɣɣ	-

(- : not attested, ( ) : attested but uncommon)

First, all segments except for /h, ʔ, w, y/ can appear in geminate clusters, as exemplified in (3).

(3) Geminate clusters

/pp-/	/ppalɔ/	'head'
/bb-/	/bbisiʔ/	'to whisper'
/tt-/	/ttinɔ/	'female'
/dd-/	/ddɛɣɔ/	'flag'
/cc-/	/ccayɔ/	'to believe'
/jj-/	/jjabaʔ/	'office'
/kk-/	/kkatɔʔ/	'frog'
/gg-/	/ggɛsɛʔ/	'matches'
/mm-/	/mmaɣi/	'cupboard'
/nn-/	/nnatɛ/	'animal'

/ɲɲ-/	/ɲɲakeʔ/	'disease'
/ŋŋ-/	/ŋŋaji/	'to learn'
/ss-/	/ssəkiŋ/	'poor'
/xx-/	/xxɛtɔ/	'car'
/ll-/	/llabɔ/	'spider'
/ɣɣ-/	/ɣɣamɔ/	'butterfly'

Geminate clusters are also found in a number of monosyllabic words, such as /nnɛ/ 'six' and /mmah/ 'gold'. Some geminate clusters are morphologically complex. For instance, /ddaɣɔh/ 'to bleed' and /lluma?/ 'to crush' are derived from the corresponding bases /daɣɔh/ 'blood' and /luma?/ 'crushed', where the initial geminated segment stands for an intransitive verbal marker and a causative marker respectively. Geminate nasals often represent the nasal prefix NN_1- 'IPFV' or NN_2- 'NMLS', e.g., /mmaŋge/ *mm-<p>aŋge* (IPFV-call) 'calling' and /ɲɲapuh/ *ɲɲ-<s>apuh* (NMLS-sweep) 'broom'. The morphological aspects of geminate clusters are examined in more detail in §5.3.

The most common non-geminate clusters have an obstruent followed by a liquid, as shown in (4).

(4) Obstruent + liquid

/pl-/	/plaka/	'thunder'
/pɣ-/	/pɣaŋa/	'behaviour'
/bl-/	/blakɛ/	'back'
/bɣ-/	/bɣani/	'brave'
/tl-/	/tliŋɔ/	'ear'
/tɣ-/	/tɣəbɛ/	'to fly'
/dl-/	/dlimɔ/	'pomegranate'
/dɣ-/	/dɣakɔ/	'insubordinate'
/cl-/	/clakɔ/	'misfortune'
/cɣ-/	/cɣəmiŋ/	'mirror'
/jl-/	/jluwɔʔ/	'to vomit'
/jɣ-/	/jɣəneh/	'clear'
/kl-/	/kladi/	'taro'
/gl-/	/gləga/	'floor'
/gɣ-/	/gɣətɔʔ/	'bridge'
/sl-/	/slaseh/	'basil'
/sɣ-/	/sɣatoh/	'one hundred'

Among these clusters, /dl/ is only attested in one instance, namely /dlimɔ/ 'pomegranate', which is more commonly pronounced as /jlimɔ/ by older speakers. /gɣ-/ is attested in a few words but it always varies with /ɣɣ-/, as seen in /gɣətɔʔ/~/ɣɣətɔʔ/ 'bridge', /gɣɛhɛ/~/ɣɣɛhɛ/ 'molar tooth' and /gɣɛjɔ/ ~/ɣɣɛjɔ/ 'church'. It can thus be concluded that in obstruent + liquid clusters, if C_1 is a stop, C_1 and the following liquid C_2 typically have different places of articulation. The absence of $^{\times}$/kɣ-/ cluster can be explained by this constraint, as the articulatory similarity between the velar /k/ and /ɣ/ led to the assimilation of earlier $^{+}$kɣ- > /xx-/ (see §7.5.2.3).

Examples in (5) illustrate the third type of clusters, which consist of two obstruents.

(5) Obstruent + obstruent

/pd-/	/pdiyɔ/	'who'
/bs-/	/bsusoŋ/	'to pile up'
/tb-/	/tbaka/	'tobacco; to be burnt'
/tj-/	/tjatoh/	'to fall (unintentionally)'
/tk-/	/tkəjuʔ/	'to be startled'
/tg-/	/tgəlɛ/	'to sink'
/cp-/	/cpədɔʔ/	'cempedak'
/kb-/	/kbumi/	'to bury'
/kd-/	/kdiyɛ/	'later'
/sp-/	/spuloh/	'ten'
/sb-/	/sbəlah/	'eleven'
/st-/	/ubi stɛlɔ/	'sweet potato'
/sd-/	/sdiɣi/	'alone'
/sc-/	/scawɛ/	'a cup'
/sj-/	/sjatɔ/	'weapon'
/sk-/	/skali/	'most; together'
/sg-/	/sgəlah/	'a glass'

Among the clusters presented in (5), /t/ and /s/ are most frequently attested as C_1, often representing segmentable morphemes. For instance, /tjatoh/ 'to fall (unintentionally)' and /tkəjuʔ/ 'to be startled' have a prefix *t-* 'NVOL' attached to the bases *jatoh* 'to fall' and *kəjuʔ* 'to startle'. In /spuloh/ 'ten' and /sbəlah/ 'eleven', a clitic *s=* 'one' is attached to the bases *puloh* 'ten' and *bəlah* 'teens'. When two stops form a cluster, it is usually the case that a voiceless stop precedes a voiced stop. In careful speech, a schwa can sometimes be

heard between two stops to ease pronunciation, as in [tgəlɛ]~[təgəlɛ] 'to sink' and [tjatoh]~[təjatoh] 'to fall (unintentionally)'. It is therefore debatable whether these words should be analysed as disyllabic with an epenthetic schwa or trisyllabic with a phonemic antepenultimate schwa (with occasional schwa deletion). The reasons for treating /tg-/ and /tj-/ as initial clusters in disyllabic words are twofold. Synchronically, this analysis fits into the overall word structure of KM, and diachronically, these stop + stop clusters share a common history with other clusters that do not show schwa epenthesis; see §7.5.2.3.

The fourth type of clusters has an obstruent followed by a nasal, as shown in (6).

(6) Obstruent + nasal

/pn-/	/pnamɔ/	'full (moon)'
/tm-/	/tmagɔ/	'copper'
/cm-/	/cmuɣu/	'jealous'
/jm-/	/jmaʔãʔ/	'Friday'
/jn-/	/jnɛlɔ/	'window'
/km-/	/kmaɣiŋ/	'yesterday'
/gm-/	/gmalɔ/	'herder'
/sm-/	/smayɛ/	'to pray'
/sn-/	/snaɣa/	'list'

Some of these clusters display variation with geminate clusters, e.g., /jmaʔãʔ/ ~/mmaʔãʔ/ 'Friday', /jnɛlɔ/~/nnɛlɔ/ 'window' and /kmaɣiŋ/~/mmaɣiŋ/ 'yesterday'. Unlike the free variation between /gɣ-/~/ɣɣ-/, however, the variation between obstruent + nasal clusters and geminate clusters appears to be lexically based. For instance, /jnɛlɔ/ 'window' has the variant /nnɛlɔ/, but /jnamɔ/ 'brand' does not exhibit this variation.

The fifth type of clusters, in which a nasal is followed by an obstruent, is attested in a few monosyllabic words listed in (7).

(7) Nasal + obstruent

/mb-/	/mbuh/	'to blow'
/mb-/	/mboŋ/	'dew'
/nd-/	/poʔ ndɛ/	'thunder'
/ŋg-/	/ŋgɛ/	'hornbill'

Another uncommon type of cluster consists of a nasal /m/ followed by a liquid /l/, as illustrated by examples in (8).

(8) Nasal + liquid

/ml-/	/mlayu/	'Malay'
/ml-/	/mlamboŋ/	'bumping'

The last type of clusters has an obstruent followed by a glide /w/, as shown in (9).

(9) Obstruent + glide

/tw-/	/twala/	'towel'	< Portuguese *toalha*	cf. SM *tuala*
/cw-/	/cwacɔ/	'climate'	< Sanskrit *ʂvaccha*	cf. SM *cuaca*
/jw-/	/jwalɛ/	'sale'		
/kw-/	/kwasɔ/	'power'	< *kə-* + Sanskrit *vaśa*	cf. SM *kuasa*
/gw-/	/gwanɔ/	'how'		

This type of clusters is typically found in loanwords, as indicated above,[19] but it is included in the discussion because at least one item is native, namely /gwanɔ/ 'how', which is a contracted form of the compound /lagumanɔ/ (method-which) 'how'.

While the patterns of attested consonant clusters might not seem systematic at first sight, a closer look reveals that the Sonority Sequencing Principle (SSP) is the main constraint outlining permissible clusters. The SSP requires the sonority in a syllable to rise or show plateau from the onset towards the nucleus (Kenstowicz 1994: 254; Blevins 1995: 210). Geminate clusters may be considered as exemplifying sonority plateau, and in most types of non-geminate clusters, namely obstruent + liquid, voiceless stop + voiced stop, obstruent + nasal, nasal + liquid, and obstruent + glide, the requirement of a rising sonority towards the nucleus vowel is met. Exceptions include clusters of /s/ + a stop, which is not uncommon violation of the SSP, and nasal + obstruent clusters such as /mb-/ and /ŋg-/, which are only found in monosyllables. The overall pattern is robust.

[19] If inherited, the expected forms should reflect the contraction of /-u.a-/ to /ɔ/ (compare KM /pɔsɔ/ 'fasting', /kɔli/ 'wok' and /bɔyɔ/ 'crocodile' with SM cognates ***pua**sa*, ***kua**li* and ***bua**ya*, see more in §7.5.2.1). Final *-a* in SM *tuala* 'towel' should also correspond to /-ɔ/ in KM with the expected form ˣ/tɔlɔ/.

2.6 Consonant sequences

Word-medial consonant sequences are most commonly homorganic sequences of a nasal + a voiced obstruent, namely /-m.b-, -n.d-, -ɲ.j-, -ŋ.g-/, as illustrated in Table 2.20. Sequences of a nasal + a voiceless obstruent do not occur.

Table 2.20: Homorganic nasal + voiced obstruent sequences in KM

Sequence	Example	Gloss
/-m.b-/	/kam.biŋ/	'goat'
	/am.biʔ/	'to take'
/-n.d-/	/din.diŋ/	'wall'
	/man.di/	'to bathe'
/-ɲ.j-/	/piŋ.jɛ/	'to borrow'
	/paɲ.jɛ/	'long'
/-ŋ.g-/	/piŋ.gɛ/	'waist'
	/tuŋ.gu/	'to wait'

The main reason to analyse these nasal + obstruent combinations as heterosyllabic sequences is that they only occur word-medially, which stands in sharp contrast with consonant clusters, which typically occur word-initially. Furthermore, while nasal + obstruent combinations such as /mb-/ and /ŋg-/ are also attested as word-initial clusters (shown in example (7) above), they are of a rather different nature, as they are only attested in monosyllables with an idiosyncratic history (see §7.5.1).

Another type of word-medial sequences contains a glottal stop /ʔ/ followed by another segment, as illustrated by the examples in Table 2.21. These sequences are often found in (historically) contracted forms or loanwords, as indicated in the table, but the exact origin of medial /-ʔ-/ is not always clear. /mɔʔtɛ/ 'rambutan' and /bɛʔki/ 'to repair' are historically suffixed forms, which can be compared with their SM cognates *rambut-an* (hair-NMLS) and *baik-i* (good-APPL), but the source of /-ʔ-/ is obscure. The origin of /sɔʔmɔ/ 'always' is suggested following Brown (1956: 48), but it also does not explain the occurrence of /-ʔ-/ in this case. /-ʔ.ŋ-/ in /ɣɛʔŋɛ/ 'light (weight)' is unexplained (cf. SM *riŋan*).

Table 2.21: Examples of /-ʔ.C-/ sequences in KM

Sequence	Example	Gloss	Origin
/-ʔ.p-/	/baʔ.pɔ/	'why'	< *buwaʔ* 'do' + †*apa* 'what'
/-ʔ.t-/	/mɔʔ.tɛ/	'rambutan'	
/-ʔ.d-/	/taʔ.dɔʔ/	'not exist'	< †*taʔ* 'NEG' + *ada*(*ʔ*) 'EXIST'
/-ʔ.c-/	/mɔʔ.ciʔ/	'auntie'	< *mɔʔ* 'mother' + *ciʔ* 'sister'
/-ʔ.k-/	/bɛʔ.ki/	'to repair'	
/-ʔ.m-/	/sɔʔ.mɔ/	'always'	< *s=* 'same' + *ɔmɔ* 'age'
/-ʔ.n-/	/saʔ.ni/	'just now'	< *saʔãʔ* 'second' + *ni* 'DEM.PROX'
/-ʔ.ŋ-/	/ɣɛʔ.ŋɛ/	'light (weight)'	
/-ʔ.s-/	/tɔʔ.sɛ/	'not want to'	< *tɔʔ* 'NEG' + *sɛ* 'desire'
/-ʔ.l-/	/tɔʔ.leh/	'cannot'	< *tɔʔ* 'NEG' + *buleh* 'can'
/-ʔ.w-/	/bɛʔ.wɔh/	'feast'	< English *big work*

† indicates earlier forms which are no longer attested.

2.7 Vowel sequences

Two vowels can appear adjacent to each other, forming a vowel sequence. All recorded vowel sequences in KM have the low vowel /a/ as the first component, as presented in Table 2.22. Among the vowels permitted in penultimate syllables, the schwa /ə/ and the mid-low vowels /ɛ, ɔ/ are never directly followed by another vowel. Intervocalic glides following high vowels are taken as phonemic rather than epenthetic (see f.n. 17 in §2.4.3.1), thus excluding possible sequences of ˣ/-i.V-/ and ˣ/-u.V-/.

Table 2.22: Vowel sequences in KM

Sequence	Example	Gloss
/a.i/	/sa.iŋ/	'friend'
/a.u/	/ba.u/	'shoulder; smell'
/a.e/	/a.e/	'water'
/a.o/	/ta.oŋ/	'year'
/a.ɛ̃/	/matɔ ka.ɛ̃/	'fish hook'

Both vowels in vowel sequences are full vowels, each occupying the nucleus of one syllable. The analysis of treating them as vowel sequences rather than diphthongs also fits into the overall phonotactic patterns of KM.

2.8 Stress

In the last part of this phonological description, some aspects of the stress pattern in KM are discussed in a cautious way. A preliminary examination suggests a correlation between stress and a higher pitch, but this observation remains tentative as the acoustic details of stress are not entirely clear. The marking of stress in the following examples is therefore somewhat impressionistic rather than being based on a detailed acoustic study.

At the phonological level, KM has no phonemic stress. There are no pairs of otherwise identical words that differ in their stress pattern. Some tendencies for the placement of stress in disyllabic words are summarised below.

First, words with two open syllables (i.e., words with a CVCV shape) generally have stress on the penultimate syllable. When the penultimate syllable has a schwa, stress falls on the final syllable instead. Some examples are given in (10).

(10)	/tanɛ/	[ˈtanɛ̃]	‘to plant’
	/tido/	[ˈtido]	‘to sleep’
	/pula/	[ˈpula]	‘island’
	/lɛpa/	[ˈlɛpa]	‘to throw’
	/bɔyɔ/	[ˈbɔyɔ]	‘crocodile’
	/dəbu/	[dəˈbu]	‘dust’
	/bəsa/	[bəˈsa]	‘big’

There are nevertheless a number of counterexamples that do not comply with the general pattern: /maɣi/ ‘to come’ and /pase/ ‘sand’ are most commonly pronounced with stress of the final syllable, i.e., [maˈɣi] and [paˈse], whereas /pəgɛ/ [ˈpəgɛ] ‘to hold’ and /ɣəgɔ/ [ˈɣəgɔ] ‘price’ have stress on the penultimate syllable even though the penultimate vowel is a schwa.

Second, in words with a closed syllable ending in a coda /ʔ/, the closed syllable carries stress. For instance, words with a CVCVC shape and a final /ʔ/ have ultimate stress, as in the following examples:

(11)	/kilaʔ/	[kiˈlaʔ]	‘lightning’
	/muloʔ/	[mũˈloʔ]	‘mouth’
	/kɔpɛʔ/	[kɔˈpɛʔ]	‘breast’
	/miɲɔʔ/	[mĩˈɲɔ̃ʔ]	‘oil’

Syllables with a coda /ʔ/ also carry stress if they appear in the penultimate position: /mɔʔtɛ/ ‘rambutan’ and /tɔʔsɛ/ ‘not want to’ have penultimate stress, i.e., [ˈmɔ̃ʔtɛ] and [ˈtɔʔsɛ].

There does not seem to be a consistent stress pattern in CVCVC words with a final consonant other than /ʔ/; both penultimate stress and ultimate stress can be found:

(12)	*Penultimate stress*		
	/mamɔh/	[ˈmãmɔ̃h]	‘to chew’
	/kabuh/	[ˈkabuh]	‘fog’
	/buɣoŋ/	[ˈbuɣoŋ]	‘bird’
	/kapoŋ/	[ˈkapoŋ]	‘village’
	Ultimate stress		
	/tujoh/	[tuˈjoh]	‘seven’
	/jatoh/	[jaˈtoh]	‘to fall’
	/kuciŋ/	[kuˈciŋ]	‘cat’
	/dagiŋ/	[daˈgiŋ]	‘meat’

Most importantly, in words with initial geminates, stress always falls on the initial syllable, regardless of whether there is a final consonant or if the penultimate vowel is a schwa. A penultimate schwa following an initial geminate can also be stressed. Examples demonstrating the cooccurrence of initial geminates and initial stress are presented in (13).

(13)	/ttinɔ/	[ˈttinɔ̃]	‘female’
	/ppalɔ/	[ˈppalɔ]	‘head’
	/mmaɣi/	[ˈmmãɣi]	‘cupboard’
	/llabɔ/	[ˈllabɔ]	‘spider’
	/ggɛsɛʔ/	[ˈggɛsɛʔ]	‘matches’
	/nnusuʔ/	[ˈnnũsuʔ]	‘to hide’
	/ssəmɔ/	[ˈssəmɔ̃]	‘all’
	/nnətɛ/	[ˈnnə̃tɛ]	‘to lie down (face up)’
	/ssəjeʔ/	[ˈssəjeʔ]	‘mosque’
	/jjəɣiʔ/	[ˈjjəɣiʔ]	‘to call out; to cry’

Other word-initial complex onsets do not always cooccur with initial stress, and stress can be found on either syllable, as shown in (14). In fact, different speakers may place stress in different positions when pronouncing the same word. Both [ˈjɣənẽh] 'clear' and [jɣəˈnẽh] are heard, and [blaˈkɛ] 'back' is also sometimes pronounced as [ˈblakɛ].

(14) *Penultimate stress*

/bɣənɛ/	[ˈbɣənɛ̃]	'to swim'
/tliŋɔ/	[ˈtliŋɔ̃]	'ear'
/tganoŋ/	[ˈtganõŋ]	'rainbow; Terengganu'
/jɣəneh/	[ˈjɣənẽh]	'clear'
Ultimate stress		
/blakɛ/	[blaˈkɛ]	'seven'
/bɣəti/	[bɣəˈti]	'to stop'
/bɣəsiŋ/	[bɣəˈsiŋ]	'to sneeze'
/tɣiŋaʔ/	[tɣiˈŋãʔ]	'to miss (someone)'

The correlation between geminates and stress has been observed in Patani Malay (Yupho 1989; Hajek & Goedemans 2003). Yupho (1989) concluded that primary stress normally falls on the final syllable in Patani Malay but shifts to the first syllable if the onset is a geminate consonant. This correlation is often used as an argument for the heaviness of geminates (see Hayes 1989; Davis 1994; Topintzi 2008; Topintzi & Davis 2017). In KM, however, words do not have ultimate stress by default. While a correlation between word-initial geminates and initial stress is also observed, stress does not "shift" to the first syllable when the initial onset is a geminate.

To sum up, stress in KM is not distinctive. There are some tendencies for stress assignment, but not without variation. It seems that the default pattern is to stress the penultimate syllable unless it contains a schwa, and a closed syllable with a glottal stop /ʔ/ attracts stress. However, due to numerous exceptions, these patterns cannot be firmly established as rules. A more robust pattern is that initial geminates always cooccur with initial stress. The tendencies for stress assignment at the word level might also be overridden at the phrasal level. More phonetic evidence is needed to understand the exact acoustic cues of stress and how stress interacts with other aspects of the phonology.

2.9 Summary

In this chapter, I have described the segment inventory of KM, how segments combine at the syllable level, and how syllables combine to form words. I presented the distribution of phonemes at both the syllable and word levels, and I examined the phonotactic constraints governing permissible clusters and sequences. Additionally, I cautiously discussed the stress pattern in KM.

At the segment level, KM has a total of twenty native phonemic consonants, including nine stops, four nasals, three fricatives, two liquids and two glides. The vowel inventory is fairly large, consisting of twelve phonemic vowels. In addition to /a, i, u, ə/, there are two sets of mid-vowels /e, o/ and /ɛ, ɔ/, along with four phonemic nasal vowels /ã, ɛ̃, ɔ̃, ũ/. There are no phonemic diphthongs.

At the syllable level, KM has a basic template of (C)(C)V(C). Any single consonant except for /ʔ, x/ can occur as an onset, but only nasals and glottals are allowed as codas. Complex onsets CC are permitted, in which the two segments can be either identical or different. Complex onsets with two identical segments manifest as geminates at the phonetic level, but at the phonological level, they are analysed as a subtype of clusters. KM boasts a large inventory of geminate clusters; all segments except for the glottals /ʔ, h/ and the glide /y/ can appear in geminated forms. Attested non-geminate clusters generally follow the SSP. A schwa cannot occur in an onsetless syllable, and nasal vowels are commonly followed by a glottal stop.

At the word level, KM exhibits a canonical disyllabic structure with a (C)(C)V(C).(C)V(C) template. Syllables with a complex onset typically appear word-initially, and word-medial consonant sequences are most commonly homorganic sequences of a nasal + a voiced obstruent. Two vowels occurring adjacent to each other are V.V sequences, which always have /a/ as the first segment. I also showed that despite having different morphological structures, simple words and derivatives share a similar word shape with the same phonotactic constraints on the distribution of phonemes. In initial position, a glottal stop /ʔ/ is not phonemic, and the velar fricative /x/ only occurs in the geminated form /xx/. Initial /ŋ, h, w, y/ are also rare. In medial position, /ʔ/ and /x/ are not allowed in native words. In final position, only three consonants /ʔ, ŋ, h/ are permitted. Mid-high vowels /e, o/

and nasals vowels do not occur in penultimate syllables, whereas the schwa is not permitted in final syllables.

Stress is not phonemic in KM. There is considerable variation as regards stress placement, and further study is required to reveal the acoustic properties of stress. Overall, stress often falls on the penultimate syllable in a disyllabic word, and it shifts to the final syllable when the penultimate syllable has a schwa. Notably, syllables with a coda /ʔ/ tend to attract stress, and initial geminates always cooccur with initial stress.