INVENTORY OF *KENYAH LEPO TAU* SEGMENTAL SOUNDS

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Abstract

Studies on the phonological description of Kenyah language are very limited. Initiated by Lees, she found 24 phonemes of Lepo Tau, one of Kenyah language branches are briefly explained on her article. Listing 18 consonants and 6 vowels, this article provides a preliminary analysis of the sound system of Lepo Tau. To a certain extent, Rufinus similarly states the same number of phonemes of the language. A study by Soriente in 2003 provides some more descriptions of the phonology of Kenyah language. It states that Lepo Tau language has 23 phonemes, 17 consonants and 6 vowels. Some of the result register 18 underlying forms of consonants in KLT which are phonetically realized into 23 representations of consonant. List of vowel shows 8 representations generated from 5 underlying forms of vowel. The descriptions of their representation include the nature of their 13 distinctive features.

Key Words:
Kenyah, Segmental Sounds

A. Introduction

Language diversity in Kalimantan is highly ranged for both indigenous and non-indigenous languages of the island. In East Kalimantan, there are not less than 20 spoken languages throughout the province.[1] This numbers include 19 indigenous languages of Kalimantan, such as Benuaq and Kenyah, and 4 non-indigenous ones that are spoken by people from other islands, such as Javanese and Bugisnese. From that numbers, native languages of East Kalimantan are stated in more detailed lists by Summer Institute of Linguistic (SIL) which mentions there are 30 at least native languages spoken in East Kalimantan only.[2]

The 30 spoken languages which are spoken by East Kalimantan civilians provides a broud opputunity for linguistic study. Among the natives of Kalimantan, Kenyah is considered as one of the big ethnic groups with about 40,000 tribe members of Kalimantan Island including Serawak, Malaysia, as stated by Rousseau in Soriente.[3] Unfortunately, this

[1] Language Center, *Language and Language Map* of Indonesia (Jakarta: National Education Department, 2008), 47.

[2] M. Paul Lewis, *Ethnologue: Languages of the World*, 16th ed. (Texas: SIL International, 2009), 16.
Online version: http://www.ethnologue.com/.

[3] Antonia Soriente. "A Classification of Kenyah Variants in Serawak and Kalimantan"

enormous linguistic diversity has not been organized appropriately and tends to be extinct. UNESCO reported that Kenyah language is categorized as one of over fifty percent of 6,000 languages in the world which are in danger of disappearing.[4] Supporting this data, Florey states that very few of Indonesia's languages have been adequately documented using modern methods, technologies and archiving practices.[5] In preserving an endangered language, the effort requires the activities of documenting and recording the oral and written literature, compiling the grammar and a dictionary of the language, and annotating the documentation related to them.[6]

Not only the endangerment level of this language triggers the necessity, but also the characters of the language had opened a wide opportunity for further research. Therefore, this article intentionally explains the nature of Kenyah phonological system, with special reference on Lepo Tau Language. Focus of this paper is limited on explaining phonemic and phonetic representations of KLT *(Kenyah Lepo Tau*) segmental sounds. This paper is also aimed to revise the same topic the author presented on a seminar in 2012.

B. Kenya Lepo Tau Language

1. Consonants in KLT

Some scholars explained that numbers of phonemes might be different among languages. The numbers are vary from 15 to 55 phonemes.[7] Others mention that the least number of phoneme is 13, found in Hawaii language, and the highest number is 75, found in one of Caucasian languages.[8] The diversity in determining phonemes of languages, including phonemes in the same language, can be due to different approaches or perspectives toward the language being investigated. For example, according to Muslich there are 28 phonemes in Bahasa Indonesia[9], while Chaer[10] and Lapoliwa[11] agree that the language has 29 phonemes.

KLT has 18 consonants and 5 vowels. This number is the same as the number of consonants in Lepo Tau or LT language listed by Lees[12], and in Lepo

(Fakultas Sains Sosial dan Kemanusiaan University Kebangsaan Malaysia, 2003), 49.

[4] UNESCO, *Annual Report UNESCO Office Jakarta*. (Jakarta: UNESCO House, 2005),126-127.

[5] Margareth Florey, Expanding Opportunities for Documenting Endangered Languages in Indonesia. In Peter K. Austin, Oliver Bond & David Nathan, *Proceedings of Conference on Language Documentation and Linguistic Theory.* (London: SOAS, 2007), 81 www.hrelp.org/eprints/ldlt_10.pdf.

[6] D. Victoria Rau, Meng-Chien Yang, and Maa-Neu Dong, "Endangered Language Documentation and Transmission," *Journal of National Council of Less Commonly Taught Languages (NCOLCTL). University of Wisconsin at Madison*, 2007, 53–76.

[7] Robert H. Robins, *A Short History of Linguistics* (London: Longman, 1969), 150.

[8] Abdul Chaer, *Fonologi Bahasa Indonesia* (Jakarta: Rineka Cipta, 2003), 131-132.

[9] Masnur Muslich, *Fonologi Bahasa Indonesia*, (Jakarta: Bumi Aksara, 2013), 94-95.

[10] Chaer, *Fonologi,* 68-70.

[11] Hans Lapoliwa, *A Generative Approach to the Phonology of Bahasa Indonesia*. (Canberra: Pacific Linguistics, 1981), 12 and 29.

[12] Shirley P. Lees. "An Introduction to The Sound System of Lepu' Tau" Vol. XII. (Sarawak:

Bakung or LB language listed by Rufinus.[13] The consonants listed are **/p, b, t, d, k, g, ʔ, s, č, ǰ, m, n, ɲ, ŋ, r, l, w, j/.** The phoneme **/h/** which also exist in many surrounding languages such as *Bahasa Indonesia* or BI[14] and language of Dayak Menterap Kabut or DMK[15] is absent from the consonant list of this study and of the two previous studies. A slightly different result is also found in Soriente's study[16] stating that LT language does not have /ɲ/ sound, therefore only 17 consonants are found in the language. Unlike KLT, LT, LB language, and BI, whose trill is alveolar, trill sound in DMK language is uvular.

The data shows that consonants in KLT/p, b, t̪, d, c, ǰ, k, g, ʔ, m, n, ɲ, ŋ, r, s, w, j, l are represented as [p, pp, pˇ, b, t̪, t̪t̪, t̪ˇ, d, c, ǰ, k, kˇ, g, ʔ, m, n, ɲ, ŋ, r, s, w, j, l] in the surface structures. In general, consonants are produced by 11 places of articulation; bilabial, labiodental, dental, alveolar, alveopalatal, retroflex, palatal, velar, uvular, pharyngeal, and laryngeal glottal.[17] Meanwhile in KLT production of consonants involves seven of them; bilabial, dental, alveolar, alveolopalatal, palatal, velar, and glottal. The sounds are articulated in seven manners; plosive, nasal, trill, affricative, fricative, approximant, and lateral approximant. The descriptions of their place and manner of articulation are shown on the following phonetic chart:

Table 1. Phonetic Representations of KLT Consonants

Manner of Ar. \ Place of Ar.		Bilabi.	Dental	Alveolar	Alv. – Pal.	Palatal	Velar	Glottal
Plosives	vl.	p, pp, pˇ	t̪, t̪t̪, t̪ˇ				k, kˇ	ʔ
	vd.	b		d			g	
Nasal	vd.	m		n		ɲ	ŋ	
Trill	vd.			r				
Affricates	vl.				c	ǰ		
Fricatives	vd.			s				
Approximant	vd.	w				j		
Lat. App.	vd.			l				

When the list of KLT consonants is compared to some previous works on Kenyah language, this result shows slight inconsistency in term of number of the consonant sounds and the points of articulation.

From three major classes of sound features, plosives affricatives, and a fricative are members of obstruents. Among sonorants are nasal consonants, a trill, a lateral approximant, and approximants. Nasals are produced in bilabial, alveolar, palatal, or velar.

This study identifies that in stem position, every consonant and vowel mostly keep their independent consonantal or vocalic values. However when affixation takes place, some values are hard to maintain. It can be seen when the prefix **/pə-/** is attached to stem with nasal **/m/** in initial position,

The Sarawak Museum Journal, 1965), 179.

[13] Albert Rufinus, *Lepo' Bakung Sound System* (Malaysia: Borneo Research Council, 1992), 1-15.

[14] Lapoliwa, *A Generative Approach*, 15-31.

[15] Frans Winarno, Firman Susilo, Hotma Simanjuntak, "Fonologi Bahasa Dayak Menterap Kabut" (Jurnal Pendidikan dan Pembelajaran (JIPP), Universitas Tanjungpura, 2015), 1.

[16] Soriente, *Classification*, 81-82.

[17] Richard Ogden, *Introduction to English Phonetics* (Edinburgh: Edinburgh University Press, 2013), 9.

the nasal must be velarized as **/ ŋ /,** as in [pəŋəŋaṭˀ] 'request'.

Most of the consonants in KLT are similarly pronounced as they are in other languages. Underlying consonant /b/ is realized as voiced bilabial plosive [b], consonant /d/ is voiced apico alveolar plosive [d], consonant /c/ is voiceless palatal affricative [c], consonant /k/ is described as voiceless velar plosive [k], consonant /g/ is labeled as voiced velar plosive, consonant /m/ is known as voiced bilabial nasal [m], consonant /n/ is described as voiced apico alveolar nasal [n], consonant /ŋ/ is articulated as voiced velar nasal [ŋ], consonant /r/ is produced as voiced alveolar thrill [r], consonant /s/ is labeled as voiceless alveolar fricative [s], consonant /ǰ/ is described as voiced alveolo palatal affricate [ǰ], consonant /l/ is described as voiced alveolar lateral approximant [l], glide /w/ is labeled as bilabial approximant [w], and glide /j/ is described as voiced palatal approximant [j]. Though, some differences are shown in the realization of consonant /p/, /t/, and /k/.

Concerning the articulation of each consonant, /p/ is materialized as [pˀ] is named as voiceless bilabial plosive when it is positioned in initial or medial position, and becomes implosive as [pˀ] in final position. Articulation of voiceless bilabial plosive in KLT is confirmed on Figure 1 which consists of soundwave images of [p] in English [pɔ:] and [p] in KLT [pəgajəŋ] 'job'.[18] Thin black vertical lines in both spectrograms of [p] show that this consonant is started with transient sound. Transient sound is random sound which occurs in short time unrepeatedly.

In KLT, on the second image in the figure, it takes 0.004 second to produce the transient sound in the production of [p]. This duration is similar to one in the first figure. This characteristic is also found in the production of [t] and [k].

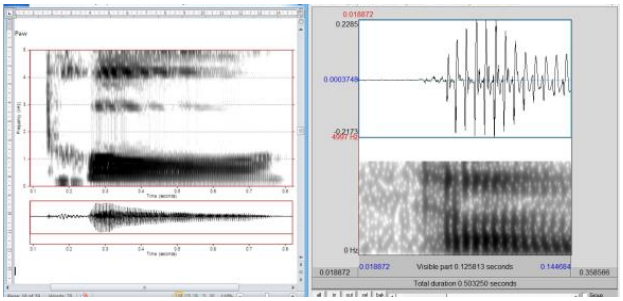

Figure 1.
Soundwaves of [k] in English and KLT

Similarly, voiceless dental plosive and voiceless velar plosive, /t/ and /k/, are both pronounced implosively or unreleased, [tˀ] and [kˀ], in final positions. The two forms of articulation are found as well in BI[19], LT[20] and DMK[21]. In Rufinus[22] and Soriente[23] is no information about the articulations of /p, t, k/ in final positions of LB and LT respectively.

[18] "Consonant Acoustics: Contents," accessed April 19, 2017, http://clas.mq.edu.au/speech/acoustics/consonants/index.html.

[19] Lapoliwa, *A Generative Approach*, 15-18.

[20] Lees, "An Introduction to The Sound System", 181.

[21] Winarno, Susilo, and Simanjuntak, *Fonologi Bahasa Dayak*. 12-14.

[22] Rufinus, *Lepo' Bakung ,* 3-5.

[23] Soriente, A Classification of Kenyah Variants, 79-80 .

The underlying consonant /t/ is produced by contacting the tip of the tongue to the teeth. In other words, /t/ is articulated as voiceless dental plosive. This claim supports Soriente's description on this sound in LT[24]. While in other referred languages (LT, LB, and DMK) this sound is described as voiceless alveolar plosive. Soriente also states that consonant elongations in LT occur in /p, t/ when any of the sounds appear after a mid-central vowel /ə/ in penultimate position in polysyllabic morphemes[25]. This case is found as well in KLT that the lengthened /p/ is found on [ləppɔʔ] 'village', [t̪əppɔʔ] 'pierced', [t̪əppa] 'also', and [ləppɪn] 'to defecate'. Lengthened /t/ is found on [lə̪t̪tɔ] 'female' and [t̪ə̪t̪təkˉ] 'cut'. It is interesting that although no evidence of minimal pairs of those words is found and the lengthening does not bring any consequence on meaning differentiation, consonant lengthening matters to acceptance of pronunciation. Similarly it applies on vowel lengthening as well, as it is mentioned later on the discussion part of KLT vowels. Nevertheless, in LT there are three other consonants undergoing the same treatment, /k/, /n/, /l/, which are materialized as [kk], [nn], and [ll] respectively[26].

Four nasals are found in KLT, voiced bilabial nasal /m/, voiced alveolar nasal /n/, voiced palatal nasal /ɲ/, and voiced velar nasal /ŋ/. In spectrogram, nasal sounds are characterized by some areas of low amplitude, in around 1600 Hz as shown on Figure 2. The first image on this figure is nasal of English word *map* and the second image is from KLT word [makət] 'to climb'[27]. Both images display similari spectrogram pattern of nasal /m/.

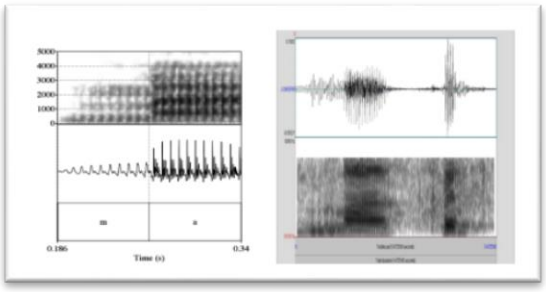

Figure 2.
Soundwaves of [m] in English and KLT

KLT recognises only one fricative, the voiceless alveolar fricative /s/. Voiceless fricative is characterised by friction noise, as shown on first image on Figure 3. This image indicates that voiceless alveolar fricative is produced by about 300 ms stretch of friction.[28] In KLT word [sukaʔ] 'pole' the fricative is produced by around 263 ms of friction (see second image on Figure 3).

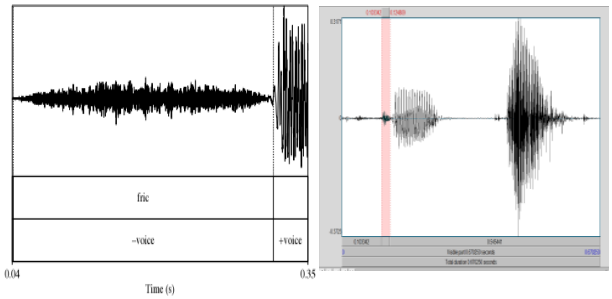

Figure 3.
Soundwaves of [s] in English and KLT

[24] Ibid.,
[25] Ibid., 80.
[26] Ibid.,
[27] Ogden, R., *Introduction to English Phonetics*. (Edinburgh: Edinburgh University Press, 2009), 141.
[28] Ibid., 120-122.

2. Vowels in KLT

KLT, LT, LB, DMK, and BI list the same vowels in their languages, /i, u, ɛ, ə, o, a/. However, some differences are found in realizations of each sound. In those languages, /i/ is articulated similarly as high front unrounded [i], except in LB[29], it is also realized longer, [i:], and in BI /i/ is also articulated as non-tense high front unrounded [ɪ] when it appears in final closed syllable.[30]

There are five underlying vowels employed on Kenyah language and realized into ten representations. Those vowels are therefore phonetically described on the following chart:

Table 2. Phonetic Representations of KLT Vowels

	Unrounded		Rounded
	Front	Central	Back
High			
Tense	i		u
Lax	ɪ		
Long			u:
Mid			
Tense		ə	
Lax	ɛ		ɔ
Long			
Low			
Tense		a	
Long		a:	

This table describes that five vowel sounds of KLT are /i, ə, a, u, o/. Some of them, /i, u, e, o/, are laxed and thus articulated as [ɪ, u, ɛ, ə, ɔ], and some, /a, ə, u/, are lengthened and thus articulated as [a:, ɛ:, u:]. This list of vowels shows similar description as in Rufinus,[31] but is inconsistent to finding of Lees.[32]

Underlying vowel /e/ is not found on Kenyah language. In case of borrowing word with /e/, such as /wese/ 'WC or toilet', /e/ is laxed as [ɛ] and /wese/ is pronounced as [wɛsɛ]. The following explanation shows how the underlying vowels related to their phonetic representations. Afterward, the description about their distinctive features is described.

Regarding vowel lengthening, the current study shows similar data as described by Lees[33] who recognizes high vowel /u/ and low vowel /a/ lengthening in LT. KLT recognizes the high back rounded vowel /u/ and open front unrounded /a/, which respectively articulated as [u:] and [a:]. Durations of the articulation are proved by Praat software to be significantly different. DMK language[34] adds close-mid back rounded vowel /o/ to the list. Meanwhile, all vowel used in LT2 language, /i, u, e, o, a/, may undergo lengthening[35].

In LB, vowel lengthening occurs to close back rounded vowel /u/, close front

[29] Rufinus, *Lepo' Bakung,* 7
[30] Lapoliwa, *A Generative Approach*, 29.
[31] Rufinus, *Lepo' Bakung,* 5.
[32] Lees, *An Introduction to The Sound System*, 182.
[33] Ibid., 184.
[34] Winarno, Susilo, and Simanjuntak, *Fonologi Bahasa Dayak,* 4-5.
[35] Soriente, A Classification of Kenyah Variants*,* 77.

unrounded vowel /i/, and open front unrounded vowel /a/.[36] This phenomenon does not occur in BI. In many languages, vowel lengthening appears when it stands on the final position of a syllable, or in an open syllable especially when it is under stress[37], or before voiced consonants[38]. What is found in KLT does not consistent to those phenomena. All examples of vowel lengthening in KLT are found in closed syllables, syllables which end in consonants, both voiced or voiceless.

In KLT /u/ is articulated as high back rounded [u] and as a longer vowel [u:]. It applies as well in DMK[39]. Besides pronounced similarly as in KLT, /u/ in LB is also pronounced by raising the tongue higher than when pronouncing [u][40]. LT1 recognizes that /u/ is back rounded optionally varying to half-close[41]. In BI, /u/ is articulated lax, as [ʊ] when it appears in final closed syllable.[42]

The underlying mid unrounded vowel in KLT is uttered as mid central unrounded vowel [ə] when it occurs in initial and medial positions, as respectively found in [ncaʔ] 'parents whose the fifth kid has died' and [giwən] 'feeling cold'. Open-mid front unrounded [ɛ] occurs on final open syllable, as in [kərɛ] 'rough surface', and in final syllable closed by glottal stop, as in [marɛʔ] 'to scrub'. This happens as well in LT, LB, DMK, and BI. Lapoliwa adds that in final closed syllable, /e/ is uttered as [ɛ]. Further, he explains that in BI schwa does not occur in final syllable of a morpheme except in a small number of borrowed items; schwa is usually unstressable while other vowels are potentially stressable[43]. In LT /e/ may have [ɪ] as the allophone when /e/ appears before velar cononant[44].

The underlying vowel /ɔ/, in KLT, only has one articulation, as open-mid back rounded [ɔ]. This way of articulation is not found in BI, DMK, and LT. However these three languages also apply different articulation, they utter back mid vowel as close-mid back rounded [o]. Laxed version of /o/ is pronounced as [ɔ] when it appears in final closed syllable in BI[45]. In DMK, this vowel is also uttered longer, [ɔ:]. While in LB, this vowel is pronounced only as [o].

The underlying vowel /a/ is realized in two ways in KLT, as open front unrounded vowel [a] and as longer vowel [a:]. While in LT and BI /a/ is pronounced one way as voiced central

[36] Rufinus, *Lepo' Bakung,* 11.
[37] Andrew Nevin. and Bert Vaux, *Introduction: The Division of Labor between Rules, Representations* (Oxford: Oxford Univ. Press., 2008), 146.
[38] Kiparsky, P., Fenno-Swedish Quantity. In In Bert Vaux and Andrew Nevins. *Rules, Constraints, and Phonological Phenomena.* (Oxford: Oxford University Press 2008), 215.
[39] Winarno, Susilo, and Simanjuntak, 2013:4)
[40] Rufinus, *Lepo' Bakung,* 6
[41] Lees, *An Introduction to The Sound System,* 182)
[42] Lapoliwa, *A Generative Approach,* 30.
[43] Ibid., 33.
[44] Soriente, A Classification of Kenyah Variants, 78.
[45] Lapoliwa, *A Generative Approach,* 31.

low unrounded vowel [a]. Duration of articulating short vowel is 0.08 second. Data used for this paper confirms that /a/ undergoes a lengthening with the duration of articulation is 0.19 second, as twice as the duration of short vowel. Regardless the absence of physical evidence of the lengthening vowels, this process is applied by LB, LT, and DMK as well.

C. Conclusion

This paper shows there are 18 underlying forms of consonants and 5 of vowels which are respectively realized into 23 and 8 phonetic representations. Production of these sounds is involving six points of articulation; bilabial, dental, alveolar, palatal, velar, and glottal, and six manners of articulation; plosive, nasal, trill, fricative, approximant, and lateral approximant. The descriptions of their representation include the nature of their 13 distinctive features. This study confirms that *h* is absent from consonant list and *ɲ* exists in KLT. In KLT trill is alveolar and underlying *t* is articulated as dental instead of apico-dental or alveolar.

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