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Thomas Kuku Alaki
library@suremail.org

Russell Norton
russell.norton@suremail.org

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Kadaru-Kurtala Phonemes

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Thomas Kuku Alaki and Russell Norton

Introduction

The purpose of this phoneme statement is to support the development of an alphabet and alphabet booklet with Kadaru speakers from Kurtala. According to *Ethnologue*,¹ Kadaru [kdu] is one of seven languages that can be distinguished within the Hill Nubian family, and it is spoken on hills east of Dilling by the following six clans, each with their own dialect:

- ▶ Dabatna or Kaaral
- ▶ Kafir or Ka'e
- ▶ Kurtala or Ngokra
- ▶ Kadaru or Kodur
- ▶ Kuldaji or Kendal
- ▶ Kururu or Tagle

The name in Arabic for the area where this language is spoken is *Jibāl Al-Sitta* “Mountains of the Six” but speakers prefer indigenous names, even though these vary according to their clan. “Kadaru” is a name of one of the clans but is also in use for the whole area and language of all six clans. The speakers consulted in this paper are from the Kurtala clan. In their view, the term “Kurtala” can refer to the whole area and language of the six clans, just as the term “Kadaru” can. They also affirm that the six clans speak related dialects and can understand each other.

The phonology of another clan dialect, Tagle, is described by Ibrahim & Huttenga² and on inspection we find that the Tagle data in that paper are very close to the Kurtala data in this paper, so we affirm that they can be considered dialects of the same language. Another Kadaru word list is recorded by Thelwall.³ Kurtala dialect speakers consulted for the data in this paper were Juma Kodi Brema, Abdu, and Ziber who live in Khartoum. A word list was transcribed

1 LEWIS, SIMONS & FENNIG, *Ethnologue*.

2 IBRAHIM & HUTTENGA, “The Phoneme System of Tagle.”

3 THELWALL, *Lexicostatistical Relations between Nubian, Daju and Dinka*.

in the International Phonetic Alphabet and in a trial alphabet in the Roman script in consultation with the speakers. The transcriptions of Kadaru words were then refined by contrastive analysis, with the speakers giving their emic judgements on whether similar phones count as same or different according to the participatory research method of Kutsch-Lojenga.⁴ This work was conducted initially during December 2011 in Khartoum, and then refined during the preparation of this paper.

A. Consonants

1. Consonant chart

Tentative consonant phonemes are shown in table 1. Consonants with limited distribution are in parentheses.

Table 1. Consonant phonemes

	labial	dental	alveolar	palatal	velar
vl plosives	(p)	ɸ	t (t ^w)	(c)	k (k ^w)
vd plosives	b	(d)	d	ʃ	(g)
fricatives				ʃ	
nasals	m		n	ɲ	ŋ
lateral			(l)		
trill			(r)		
flap			(ɾ)		
approximants	(w)			(j)	

There are voiced and voiceless plosives in five places of articulation and nasals in four of these. There is only one fricative /ʃ/ which we assign to the palatal column. There are three alveolar liquids – a lateral, a trill, and a flap – and there are two central approximants.

2. Consonant distribution

Table 2 shows the distribution of consonants word-initially, intervocalically, and word-finally:

Table 2. Consonant distribution

phon.	initial	intervocalic	final
(p)	—	—	kɔp lion
b	búl	dog àbúl	mouth —
ɸ	ɸurɪɲ	locust jaɸu	goat íɸ person
(d)	—	biɸiɸ	bat biɸiɸ bat
t	tidəm	ostrich titim	dove fút thread
d	doː	skin dɛdɛ	cloud fúd sand
(t ^w)	t ^w anɔ	bellies —	—
(c)	caɲ	python —	—

4 KUTSCH-LOJENGA, “Participatory Research in Linguistics.”

phon.	initial		intervocalic		final	
ʃ	ʃi:l	king	èʃi	hand	kuʃ	bowl
ʒ	jadʊ	tongue	koʒəŋ	reptile	íʒiʒ	liver ⁵
k	kùǰú	mount	káká:	stone	tɛʒʒuk	thre
(k ^w)	k ^w aʃa	bowl ⁶	—	—	—	—
(g)	—	—	buga	buffalo	—	—
m	mèŋ	back	kumùl	snake	taʒum	tortoise
n	num	throne	aniŋa	drum	ɛnɛn	mother
ɲ	ɲiŋɪl	leftside	tʊ:ɲa	liver	ɬuriŋ	locust
ŋ	ŋamɪɛ	there	aniŋa	drum	ɬoruŋ	chameleon
(l)	—	—	ʃalɛ	salt	kamùl	axe
(r)	—	—	kòru	shield	ór	tree
(ɾ)	—	—	taʒum	tortoise	—	—
(w)	wərtíl	sheep	kúwa	kitchen	—	—
(j)	jaʒʊ	goat	ɾja	neck	—	—

Blank cells (—) show that no word was found with the consonant in that position. Only six obstruents /t̪/, /t/, /d/, /ʃ/, /ʒ/, /k/ and the four nasals are confirmed in all three environments. The distributions of the other consonants are limited in a variety of ways:

word-initial only	word-initial & intervocalic only	intervocalic only	intervocalic & word-final only	word-final only
c	b	g	ɖ	p
k ^w	w	ɾ	l	
t ^w	j		r	

Table 3.
Consonants with limited distribution

The plosives show a wide variety of distributional limitations in the data, but the three liquids /l/, /r/, /ɾ/ share the property of being absent word-initially and the two approximants /w/, /j/ share the property of being absent word-finally.

Of the consonants with restricted distributions, the labial plosives [b] and [p] in particular are phonetically similar sounds occurring in complementary distribution. However, this complementary distribution is not repeated for voiced and voiceless obstruents at other places of articulation. Rather, the specification of voicing is subject to different redundancies for labial, dental, and velar obstruents, as given in table 4. Blank cells indicate that both voiced and voiceless obstruents have been recorded in that environment, so voicing is not specified either as voiced or as voiceless in that en-

5 The word [tʊ:ɲa] ‘liver’ is considered to be native to Kurtala, but [íʒiʒ] is another word meaning ‘liver’ in circulation.

6 [k^waʃa], [k^wɔʃa], [kuʃ] ‘bowl’ are variant forms with the same meaning.

environment for that place of articulation. For example, there are no voicing restrictions on alveolars or palatals.

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Table 4.
Redundancies
in the
voicing
feature

	initial	intervocalic	final
labial	voiced only	voiced only	voiceless only
dental	voiceless only		
alveolar			
palatal			
velar	voiceless only		voiceless only

Whether labials are voiced or voiceless is specified redundantly in all three environments. This is also the case in the dominant language Sudanese Arabic [apd],⁷ where labial plosives are always voiced. However, Kadaru-Kurtala is distinguished from Sudanese Arabic in word-final position. In Sudanese Arabic, labial plosives are voiced word-finally, e.g. [ba:b] “door,” but in Kadaru-Kurtala, labial plosives are voiceless word-finally, e.g.:

íp “tail”
 ʃap “giraffe”
 kɔ́p “lion”
 nɔ́p “gold”
 tɔ́p “earth”

The phonetics of voiceless word-final plosives in Kadaru-Kurtala is described further below under “Free Variants.”

2.1 Free variants

A voiced palatal plosive may become a postalveolar fricative word-initially.

c ~ ʃ / #_ e.g. caŋ, ʃaŋ “python”

A voiced velar plosive may become a fricative intervocalically.

g ~ ɣ / V_V e.g. èyíl “today” úgú “blood”
 èyí “goats” buga “buffalo”

An alveolar trill may become a single tap intervocalically.

r ~ r / V_V e.g. ara “rain” kòru “shield”
 èrí “rope” uri “black”

7 LEWIS, SIMONS & FENNIG, *Ethnologue*.

A voiceless plosive may be unreleased or with nasal release word-finally.

P^ʰ ~ P^M / _# e.g. íp^ʰ, íp^M “tail”
 (P = voiceless plosive, M = homorganic nasal)

In a word-final voiceless plosive, the closure is made with an observable degree of muscular tension and crucially this closure is maintained for longer than the air pressure behind the closure in the oral cavity, so that there is no oral release of the voiceless plosive. This produces an unreleased plosive e.g. [p̚], unless the air pressure behind the oral closure is released through the velic passage instead by opening the velum, producing a plosive with nasal release e.g. [p^M]. The nasal release is clearly voiceless, confirming that the word-final plosive is voiceless rather than voiced. Compare also the plural form “tails” where voicelessness is reconfirmed:

íp^ʰ, íp^M “tail” íppanu “tails”

3. Consonant contrasts

Contrastive word pairs are shown for phonetically similar consonants in table 5. Since minimal pairs are lacking, word pairs are given in which the two consonants are in minimal contrast in the syllable in which they occur. Weaker contrastive word pairs are shown in parentheses.

p-b	—	—	—	—
b-m	abul	mouth	ɔmul	elephant
b-w	bara	yellow	wata	ash
m-w	mɛŋ	back	wɛŋga	that
t-ɖ	(ít	person	biɖiɖ	bat)
t-t	(turiŋ	locust	titim	dove)
ɖ-d	uɖu	breast	dɛɖu	cloud
t-t ^w	taɾum	tortoise	t ^w anu	bellies
t-d	tɛŋu	thigh	dɛɖu	cloud
	katu	field	dɛɖu	cloud
	fút	thread	fúd	sand
d-n	ɖul	larynx	num	throne
d-l	(dɛɖu	cloud	bɛɛ	sesame)
n-l	(ɛnɛn	mother	bɛɛ	sesame)
l-r	kɛɪ	food	ɛɪ	rope
l-ɾ	fale	salt	taɾɛ	plate
r-ɾ	(ɪɪɪŋ	nose	kɪɾáj	drum)
c-ɟ	(caŋ	python	jadu	tongue)

Table 5. Contrastive word pairs

ʃ-ʒ	(ʃaŋ	python	ʒaɗu	tongue)
	ʃuʃəŋ	to go	koʒəŋ	reptile
ʒ-ŋ	ʒaɗu	tongue	ŋama	dough
ŋ-ʒ	ŋama	dough	ʒaɗu	sugarcane
ʒ-ʒ	ʒaɗu	tongue	ʒaɗu	sugarcane
k-k ^w	káká:	stone	k ^w aʃa	bowl
k-g	káká:	stone	buga	buffalo
ŋ-w	ŋamɪɛ	there	wata	ash
k ^w -w	k ^w aʃa	bowl	wata	ash
m-n	(mɛŋ	back	num	throne)
n-ŋ	ɛnɛn	mother	kɛŋɛltu	egg
ŋ-ŋ	ŋama	dough	ŋamɪɛ	there

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Word pairs for voiced-voiceless contrast vary considerably in quality for different places of articulation: the alveolar contrast /t-d/ is well supported by word pairs in multiple environments, with intermediate degrees of evidence of contrast at other places of articulation, down to the labials /p/ and /b/ which appear in complementary distribution giving no contrastive word pairs at all. Nevertheless, at the stage of forming a trial alphabet, the speakers who were consulted perceive an emic distinction between /p/ and /b/, including the perception that Kadaru word-final [p] is different from Sudanese Arabic word-final [b]. It remains to be seen whether this perception of the distinction between /p/ and /b/ is shared by a larger number of Kadaru speakers, and this is being tested by the distribution of an alphabet booklet based on the distinctions presented in this paper.

The palatal plosive /c/ and fricative /ʃ/ also do not have contrastive word pairs, and there is evidence of free variation between them in section 2.1 above. But again, consulted speakers seem to perceive an emic distinction between /c/ and /ʃ/. As this is the only fricative phoneme in the language in table 1, we conclude that it is the result of a shift *c > ʃ which is incomplete in word-initial position where the cases of [c] are found, and also incomplete for double consonants (see section 4 below). The speakers are aware of this recent sound shift in their language, and hence aware of the distinction itself between /c/ and /ʃ/, perhaps aided by the acoustic difference between [c] and [ʃ].

4. Consonant sequences

Table 6 shows that Kadaru-Kurtala has consonant sequences word-medially. The range of attested consonant sequences is relatively free, including examples of non-homorganic nasal and plosive apparently conditioned by the preceding vowel, [mt] after a rounded vowel and [ɲd] after a front vowel. It also includes at least one se-

quence of two plosives. This exceeds the range of consonant sequences found in the related Hill Nubian language Uncu (also identified as Ghulfan [ghl]⁸) in data we elicited in 2007, shown on the right-hand side of the table for comparison.

Kadaru-Kurtala			Uncu		
n̥	n̥n̥ʈu	moon	n̥	ʈɛn̥ʈú	intestines
n̥	ʃún̥ʈu	small	n̥	kán̥d̥ɛʈú	bird
nt	kúntú	knee	nt	òntú	arm
nd	kunda	smoke	nd	arɛndúwa	sky
ɲ	kɲɲaɲ	lyre	ɲ	tɲɲɔ	thigh
ŋ	ɔŋɔl	road			
mt	kumtɛ	(woman's name)			
ɲd	akɲdɔ	adze			
l̥	el̥ɔ	heart	l̥	ábɔl̥ɛ	adze
lt	káltú	eye	lt	káltú	eye
ld	kuld̥aɲɪ	(clan name)			
lɛ	ulɛa	ear	lɛ	ulca	ear
lm	ʃalmɛ	chin			
rb	ʈarbɔ	twenty	rb	ʈàrbɔ	twenty
r̥	kɔr̥ʈu	shoe	r̥	ɔr̥ɪ	sheep
rt	wɛrtíl	sheep	rt	àmurtɛ	palm
r̥	kɔr̥ɔ	forest	r̥	ʃɛr̥ɔ:	short
			rd	k ^w ardɪɛ	cock
rʃ	kɔr̥ʃu	six	rʃ	írʃu	wind
rk	bɛrku	(placename)			
			rɲ	ɔrɲaɹu	leaf
kl	taklɛ	(clan name)			
			kr	kákɪrí	stones
kʃ	ɲɔkʃal	(clan name)			
dk	kudkire	dust			

Table 6.
Consonant
sequences

Here, we find a dissimilation process affecting the fricative:

The postalveolar fricative /ʃ/ becomes alveolopalatal following an alveolar lateral.

/ʃ/ → [ɕ] / L e.g. ulɛa “ear”

Table 7 shows that Kadaru-Kurtala also has long consonants word-medially. Since the language has consonant sequences word-medially as in table 6, the long consonants in table 7 are interpreted as double consonants.

Table 7. Double consonants

	single		double	
pp	íp	tail	íppanʊ	tails
tt	katʊ	field	attʊ	wing
dd	dɛdʊ	cloud	kuddʊ	leg
cc	caŋ	snake	ticcɔ	five
ʃʃ	tɛʃɛ	green	tɛʃʃʊk	three
kk	kúkú	chicken	wɔkkú	chest
gg	ógú	blood	iggá	ire
mm	òmúl	elephant	umma	many
nn	aniŋa	drum	tinna	wife
ll	falɛ	salt	kellɛ	red
rr	kére	porridge	terrɛ	bull

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The plosives /p/, /c/, /g/ all have very restricted distributions as single consonants, but they also occur as double consonants providing a little more support for them, although we have not found contrasting examples of /pp/ with /bb/ or /cc/ with /ff/. However, voiced and voiceless double plosives both occur at alveolar, palatal, and velar places of articulation, providing some more support for the voicing contrasts /t-d/, /c-ʃ/, and /k-g/.

B. Vowels

1. Vowel phonemes

Vowel phonemes are given in table 8. Two less well-established phonemes are given in parentheses.

Table 8. Vowel phonemes

	[-ATR]		[+ATR]	
close	ɪ	ʊ	i	u
mid	ɛ	ɔ	(e)	o
open	a		(ə)	

2. Vowel contrasts

Table 9 shows that all ten vowels occur in words with two identical vowels or words with one vowel. These words contain only one vowel quality and therefore demonstrate that the vowel qualities are not derived by harmony with another vowel, but are substantiated by separate word sets verified by speakers.

Table 9. Word sets for vowel phonemes

	two identical vowels		single vowel	
i	iriɖ	canoe	it̩	person
	írín	scorpion	ʃín	termite house
	titim	dove	ʃí:l	king
	biɖiɖ	bat	t̩i	cow

	two identical vowels		single vowel	
ɪ	kíní	doors	íp	tail
	írɪŋ	nose	ɽìl	hair
	ɲɪŋɪl	left side	ɪ:	sun
e	nenʃê	what is it?	kel	stick
ɛ	bɛɛ	sesame	kél	boundary
	ɛnɛn	mother	mɛɲ	back
	ɽɛɛɛ	bull	bɛ:	one
ə	bɛʃɛ	green		
	kəɽəl	(placename)		
	ʃəfə	k.o. tree		
a	kàkà	crow	kal	porridge
	káká:	stone		
	ára	rain		
	tataŋ	all		
ɔ	ókò	chest	tɔ:	belly
	ɔŋɔl	road	kɔɔ	lion
	ɔrrɔ	two	ɔŋ	year
o	óndo	donkey	kòl	house
			do:	skin
			o:	hillside spring
ʊ	kuddu	leg	búl	dog
	úgú	blood	num	throne
	úɖú	breast	dúl	larynx
	kumùl	snake	ʃút	thread
u	unu	flies	ʃúd	sand
	kúntú	knee	ku:	chicken stomach
	kúndu	smoke		
	kùdú	mount		

Table 10 shows contrastive word pairs for phonetically similar vowels. Wherever possible the word pairs show the two vowels in minimal contrast in the syllables in which they occur.

i-ɪ	ít	person	íp	tail
	írɪŋ	scorpion	írɪŋ	nose
e-ɛ	kel	stick	kél	boundary
ə-a	əɲu	fat	aɲu	alive
	ondo	donkey	nɔŋɽu	moon
o-ɔ			ɔŋ	year
	uri	black	unɪ	grass
ɪ-ɛ	ɽìl	hair	kél	boundary
ɛ-a	kél	boundary	kál	porridge
a-ɔ	àbúl	mouth	ómɔl	elephant

Table 10.
Contrastive word
pairs

ɔ-ʊ	ɔkɔ	chest	úgú	blood
o-ʊ	kòl	house	búl	dog
i-e	fí:l	king	kel	stick
u-o	uri	black	ori	rope
e-ə	egil	today	əboki	(place name)

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3. Vowel Distribution

All ten vowels have unrestricted distribution with respect to word boundaries as shown in table 11.

Table 11. Vowel distribution in the word

phon.		initial	medial		final	
i	irɪɪɖa	root	kedil	bone	èfí	hand
ɪ	íɟɪɪɟ	nose	ɟíl	hair	kíní	doors
e	èfí	hand	bèrí	yellow	bijɛ	beer
ɛ	ɛnɛn	mother	ɟɛrɛ	bull	bɛɛ	sesame
u	unɪɟ	fly	fúɟí	fish spear	úgú	big
ʊ	únɪ	relative	búl	dog	ìɖʊ	woman
o	ónɔ	donkey	kól	house	do:	skin
ɔ	ómɔl	elephant	bólɟʊ		ɔrɔ	two
ə	əboki	(place name)	koɟəɟ	alligator	fekkə	(pers. name)
a	àttú	wing	kal	porridge	dɔta	tool

The distribution of vowels is restricted by the generalisation that vowels of different [ATR] sets are not mixed in the same word. Table 12a gives words with [-ATR] vowels, and table 12b words with [+ATR] vowels.

Table 12a. Vowel harmony [-ATR]

	ɪ	ɛ	a	ɔ	ʊ
ɪ	tɪtɪm	bɪkè	ɪgga	ídɔ	ɪ:ɬʊ
	dove	worms	fire	eight	louse
ɛ		bɛɛ	èdaɟ		dèdú
		sesame	leaf		cloud
a	ɔɾɪ	taɾɛ	ara	karɔl	áttú
	sheep	plate	rain	fish	wing
ɔ	ʊnɪ	kòré	dɔta	ɲgɔɬ	kɔɾɬʊ
	grass	leprosy	tool	near	shoe
ʊ		úrè	kunda		kútú
		black	smoke		stone

Table 12b. Vowel harmony [+ATR]

	i	e	ə	o	u
i	iriɖ	bijɛ	tidəm		iru:
	canoe	beer	ostrich		sea

	i	e	ə	o	u
e	bèrí yellows	nenjê what is it?	kendəl (clan name)	elɔ̃o heart	bèɲu thigh
ə	wərtíl sheep		ʃəfə kind of tree	əboki (place name)	əɲu fat
o	ori rope	ɬorfen (man's name)	kojəɲ reptile	ondo donkey	kòru shield
u	uri black	kúmè kind of rat		durko (man's name)	kúndu smoke

C. Syllables and prosody

1. Syllable structure

Kadaru-Kurtala has words with all four basic syllable types, in table 13.

CV	ɬí	cow
V	è:	we
VC	ɔɲ	year
CVC	kòl	house

Table 13.
Syllable types

The four syllable types combine in longer words in table 14.

CV.CV	bɛ.lɛ	sesame
CV.CVC	ka.ɾɔl	fish
CVC.CV	kɔɾ.ɬu	shoe
CVC.CVC	wər.til	sheep
VC.CV	on.do	donkey
VC.CVC	ɔɲ.gɔl	road
V.CV	u.nɪ	grass
V.CVC	i.rɪɔ̃	canoe
V.V		

Table 14.
Syllable types
combined

The combination V.V is lacking. In [ɪja] “neck” and [kɔwa] “kitchen,” the intervocalic approximant is arguably inserted as a transitional sound following /ɪ/ and /ɔ/, since /j/ and /w/ have not been found between two non-high vowels, which would give these words a /VV/ sequence underlyingly. Since there is no wider support for V.V sequences from words containing other sequences such [ɛɔ], [ɔɪ], etc. the approximants /j/ and /w/ ensure that [ɪ.ja] “neck” and [kɔ.wa] “kitchen” fit into the CV.CV and V.CV structures that are attested in other words.

2. Vowel length and tone

We offer only tentative initial evidence regarding the role of prosodic features of vowel length and tone. In tables 15a and 15b, examples of long vowels are shown in words of one open syllable and in longer words, respectively. We have very few examples of contrasting short vowels in the same environment; nearly all of them are for high front vowels.

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Table 15a. Vowel length in words of one open syllable (V of CV)

	long		short	
i	bi:	other	ṭí	cow
ɪ	ɪ:	sun	bɪ	some
(e)				
ɛ	è:	we		
	té:	grinding		
	bɛ:	one		
(ə)				
a				
ɔ	tɔ:	belly		
o	o:	hillside spring		
	dò:	skin		
ʊ	ù:	head		
	ku:	nipple		
u	ku:	chicken stomach		

Table 15b. Vowel length in longer words

	long		short	
	ʃí:l	king	ṭíl	hair
	ɪ:tu	louse	iru:	sea
	káká:	stone	kàkà	crow
	tu:pa	liver		

Since there is a strong tendency in the data for long vowels to occur in words of one open syllable, more data is needed to establish a reliable vowel length contrast as opposed to predictable lengthening.

In table 16 we also note some tentative evidence that tone contrast exists in the language.

Table 16. Possible tone contrasts

high		low	
té:	grinding	tè:	lake
kál	after me	kàl	porridge
káká:	stone	kàkà	crow
únì	relative	ùnì	grass

More investigation is needed to be able to analyse tone in the language.

D. Orthography

In consultation with Kadaru-Kurtala speakers, the letters in table 17 were suggested for writing the language.

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phoneme	letter	example	gloss
a	a	<i>aninga</i>	drum
b	b	<i>bul</i>	dog
c	c	<i>ticcu</i>	five
d	d	<i>dotu</i>	horn
ɖ	dh	<i>bīdhīdh</i>	bat
ɛ	e	<i>edang</i>	leaf
e	ë	<i>ësi</i>	hand
g	g	<i>egi</i>	goats
ɾ	i	<i>igga</i>	fire
i	ī	<i>tī</i>	cow
ʃ	j	<i>jadhu</i>	tongue
k	k	<i>kūdhū</i>	mountain
kʷ	kw	<i>kwosa</i>	stone dish
l	l	<i>köl</i>	house
m	m	<i>omul</i>	elephant
n	n	<i>nonthu</i>	moon
ŋ	ng	<i>kirang</i>	drum
ɲ	ny	<i>īrīny</i>	scorpion
ɔ	o	<i>or</i>	tree
o	ö	<i>köl</i>	house
p	p	<i>ip</i>	tail
r	r	<i>ara</i>	rain
ɾ	rh	<i>tarhum</i>	tortoise
ʃ	s	<i>usi</i>	hand
t	t	<i>turundu</i>	chameleon
ʈ	th	<i>thürī</i>	pot
ʊ	u	<i>ulca</i>	ear
u	ü	<i>ünütü</i>	star
w	w	<i>wartil</i>	sheep
j	y	<i>yadu</i>	sugarcane

Table 17. Proposed letters

Jabr El Dar has proposed an inventory of letters for all the communities of the Ajang or Hill Nubian language family to write their languages,⁹ based on the phonologies of Deleny or Dilling [dil], Kar-

9 JABR EL DAR, "Towards a General Orthography of Ajang Languages."

ko [kko], and the Tagle dialect of Kadaru [kdu] as analysed by Ibrahim and Huttenga.¹⁰ Our suggested Kadaru-Kurtala alphabet uses the consonant symbols and digraphs proposed by Jabr El Dar, but we add *s* for the palatal fricative to distinguish it from *c* for the palatal plosive. Abdelbagi Ali Daida of the Uncu Documentation Project at the American University in Cairo writes the Uncu or Ghulfan [ghl] language using a digraph *sh* for the palatal fricative, but this digraph is not employed in contrast with the simple graph *s* which is not used in his orthography, but Kadaru-Kurtala writers favour the single graph.

For vowels, Jabr El Dar proposes adding extra vowel symbols to the five vowel letters {*aeiou*} of the Roman script in order to write all ten vowels. He mentions that other languages of Sudan use the umlaut for [+ATR] vowels, but raises the problem that it is not easy to read a vowel with a tone diacritic on top of an umlaut diacritic. However, Uncu is written using umlauts for [+ATR] vowels, and in alphabet booklets that we have facilitated for many other languages of the Nuba Mountains and Blue Nile, umlauts are widely and successfully used to mark [+ATR] vowels, known to members of the communities as “heavy” vowels. Furthermore, writers from some of these communities, in particular Katcha, Lima, and Julud, had earlier tried vowel digraphs {*ax,ex,ix,ox,ux*} for [+ATR] vowels and have since decided to switch to using umlauts instead. Therefore, we propose umlauts for [+ATR] vowels in Kadaru. The exception to this is that the letter {*a*} without umlaut is currently in use for writing Kadaru for both [-ATR] and [+ATR] central vowels, which may be feasible because of the relative rarity of the [+ATR] central vowel /ə/ occurring as the only vowel in a word.

We are recommending an orthography without tone marks. Bird has shown that including tone marking in a writing system can slow down reading and writing,¹¹ and therefore we consider that not every tonal language needs to write tone. If need be, there are ways of writing tone other than stacking further diacritics on top of the umlaut. In Laru [lro], for example, a Heiban language in the Nuba Mountains where [+ATR] vowels are written with umlauts, contrastive high tone is marked by writing a double vowel, as documented by Abdalla.¹² So if tone contrasts are found to be widespread in Kadaru to distinguish words and grammatical differences, and if they are clearly perceived by Kadaru speakers, then there could be consultations on writing tone.

10 IBRAHIM & HUTTENGA, “The Phoneme System of Tagle.”

11 BIRD, “When Marking Tone Reduces Fluency.”

12 ABDALLA, “Statement about the Tone Feature in Laru.”

E. Conclusion

Kadaru-Kurtala has a consonant inventory spread over five places of articulation, but many of the consonants show limited distributions. As a result, the distributional evidence does not always match the emic perceptions of contrast by the speakers consulted, in particular for the plosives /p/ and /c/ which are not well-supported by distributional evidence. Kadaru-Kurtala also has a system of ten vowels with [\pm ATR] contrast for each of the five vowel qualities, and ATR harmony in words with two or more vowels. Contrastive evidence for two of the [$+$ ATR] vowels /e/ and /ə/ is less frequent in our data, and so far it seems possible for writers to under-differentiate the /ə-a/ contrast by representing both phonemes by one letter in their alphabet, as they have chosen to do. The proposed phonemes and the letters that represent them may now be tested with more members of the language community.

Some initial evidence on possible vowel length and tone contrasts in the language was presented, but an analysis of prosodic contrasts is left for others to research, noting the existing analysis by Ibrahim & Huttenga of prosodic contrasts in the Tagle dialect.¹³

¹³ IBRAHIM & HUTTENGA, "The Phoneme System of Tagle."

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