Kadaru-Kurtala Phonemes

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, Kadaru 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 & Huttenga 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. Kadara 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.

| Consonants | labial | dental | alveolar | palatal | velar |
|------------|--------|--------|----------|---------|-------|
| vl plosives | (p) | ʈ | t (tʷ) | (c) | k (kʷ) |
| vd plosives | b | (d̪) | d | ʈ | (g) |
| fricatives | | | | | \ʃ |
| nasals | m | n | ɲ | ŋ |
| lateral | | | | | \l |
| trill | | | | | \r |
| flap | | | | | \ɹ |
| 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, intervocally, and word-finally:

| phon. | initial | intervocalic | final |
|-------|---------|--------------|-------|
| (p)   | —       | —            | kɔp   | lion |
| b     | bʊ́l    | dog          | ɧʊ́l   | mouth |
| ʈ     | ʈurɪɲ  | locust       | ɹɪɲ   | person |
| (d)   | —       | biːd̪iːd̪    | bat    | —     |
| t     | tidəm   | ostrich      | titim  | dove  |
| d     | doː     | skin         | ɹɛdʊ  | cloud |
| (tʷ)  | tʷanʊ   | bellies      | —      | —     |
| (c)   | caŋ     | python       | —      | —     |

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

The plosives show a wide variety of distributional limitations in the data, but the three liquids /l/, /r/, /ɽ/ 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 [tuːna] “liver” is considered to be native to Kurtala, but [ɪ́ɣɪ́ɟ] is another word meaning “liver” in circulation.

6 [kʷaʃa], [kʷɔʃa], [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.

| Place of Articulation | Initial | Intervocalic | Final |
|-----------------------|---------|--------------|-------|
| Labial                | voiced only | voiced only  | voiceless only |
| Dental                | voiced only | voiced only  | voiceless only |
| Alveolar              | voiceless only |            | voiceless only |
| Palatal               | voiceless only |            | voiceless only |
| 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], 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. [baːb] “door,” but in Kadaru-Kurtala, labial plosives are voiceless word-finally, e.g.:

- ip “tail”
- šap “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, šaŋ “python”

A voiced velar plosive may become a fricative intervocalically.

- g ~ ɣ / V_V  e.g. èɣi “today”  ūɡu “blood”
- èɣi “goats”  buɡa “buffalo”

An alveolar trill may become a single tap intervocalically.

- r ~ ɾ / V_V  e.g. ara “rain”  kɔ́ru “shield”
- èrì “rope”  uri “black”

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7  Lewis, Simons & Fennig, Ethnologue.
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A voiceless plosive may be unreleased or with nasal release word-finally.

\[ P^\prime \sim P^m / \_# \] e.g. \( \text{i}p^\prime \), \( \text{i}p^m \) “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. \( [p^\prime] \), 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:

\( \text{i}p^\prime \), \( \text{i}p^m \) “tail” \( \text{i}ppanu \) “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 | omul | elephant |
| b–w | bara | yellow | wata | ash |
| m–w | men | back | wenga | that |
| t–d | (it | person | bidigi | bat |
| t–t’ | (tuiri | locust | titim | dove |
| d–d’ | udun | breast | dudu | cloud |
| t–t” | tanum | tortoise | tanu | bellies |
| t–d | tenu | thigh | dudu | cloud |
| ku | field | dudu | cloud |
| fu | thread | sud | sand |
| d–n | dul | larynx | num | throne |
| d–l | (dedu | cloud | biele | sesame |
| n–l | (eenen | mother | biele | sesame |
| l–r | keli | food | eri | rope |
| l–t | jale | salt | tar | plate |
| r–τ | (iri | nose | kirangi | drum |
| c–τ | (can | python | jadu | tongue |

Table 5. Contrastive word pairs
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 [nd] after a front vowel. It also includes at least one se-
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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       |
|----------------|------------|
| ṉt  nɔntu     | moon       |
| ṉd  yʊntʊ     | small      |
| nt  kʊntʊ     | knee       |
| nd  kʊnda     | smoke      |
| nj  kʊŋŋaŋ    | lyre       |
| ŋg  ʊŋɡal     | road       |
| mt  kʊmtɛ     | (woman’s name) |
| nd  akiṇdu    | adze       |
| lg  ɛldo      | heart      |
| lt  káltʊ     | eye        |
| lg  kʊldaŋ    | (clan name) |
| lg  ʊlcɑ      | ear        |
| lm  fɑlme     | chin       |
| rb  ʈarbu     | twenty     |
| rt  ʈɔrtɪ     | sheep      |
| rt  wɔrtɪl    | sheep      |
| rd  kɔrdʊ     | forest     |
| rf  ɪ́rʃʊ     | wind       |
| rk  bɛrdʊ     | (placename)|
| kl  takle     | (clan name)|
| kr  kákri     | stones     |
| kɭ  ʊŋkral    | (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. ʊlcɑ “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.

⁸ Lewis, Simons & Fennig, Ethnologue.
The plosives /p/, /c/, /ɡ/ 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 /ʃʃ/. 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–ɟ/, and /k–ɡ/.

B. Vowels

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

| close       | -ATR | +ATR |
|-------------|------|------|
| i           |      | u    |
| u           |      | i    |
| mid         |      |      |
| e           |      | (e)  |
| o           |      | (a)  |
| open        |      |      |
| a           |      |      |

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 7. Double consonants

| single | double  |
|--------|---------|
| ɪp     | ɪppanu  |
| ɪt     | ɪtu     |
| ɪd     | ɪddu    |
| ɪc     | ɪcc     |
| ɪʃ     | ɪʃʃ     |
| ɪk     | ɪkʊ́k   |
| ɪɡ     | ɪɡɡá    |
| ɪm     | ɪmma    |
| ɪn     | ɪnna    |
| ɪl     | ɪlɛ́r   |
| ɪr     | ɪrrɛ    |

Table 8. Vowel phonemes

Table 9. Word sets for vowel phonemes

two identical vowels | single vowel
---------------------|--------------
iriɖ | canoe       | ɪt | person
irɪŋ | scorpion    | ʃɪŋ | termite house
titim | dove       | ʃɪːl | king
bitid | bat         | ʊti | cow
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.

| two identical vowels | single vowel |
|----------------------|--------------|
| ɪ | doors | ɪ́p | tail |
| ɪ́rɪ́n | nose | ɪ́l | hair |
| ɲɪ́l | left side | ɪ́ | sun |
| ɲɛ́ | what is it? | ɪ́ | stick |
| ɛ́ | sesame | kɛ́l | boundary |
| ɛ́nɛ́n | mother | mɛ́n | back |
| ɛ́rɛ́ | bull | bɛ́: | one |
| ɛ́bɛ́ | green |
| ə́ | (placename) |
| ʃəʃə | k.o. tree |
| a | kàkà | crow | kal | porridge |
| káká: | stone |
| ára | rain |
| tataŋ | all |
| ɔ́ | chest | tó: | belly |
| ɔ́ŋɔ́ | road | kɔ́ | lion |
| ɔ́rɔ́ | two | ɔ́ | year |
| o | óndo | donkey | kṍl | house |
| ɔ́ | skin |
| ʊ́ | hillside spring |
| u | kududu | leg | bṍl | dog |
| úgú | blood | nʊ̃m | throne |
| úgú | breast | dṍl | larynx |
| kumul | snake | jṹt | thread |
| u | unu | flies | júd | sand |
| kúntú | knee | ku: | chicken stomach |
| kúndu | smoke |
| kúdú | mount |

Table 10. Contrastive word pairs
3. Vowel Distribution

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

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 11. Vowel distribution in the word

| phon. | initial    | medial     | final  |
|-------|------------|------------|--------|
| i     | ɪɾɪd̪a     | kedil      | ɛʃí    | hand  |
| i     | ɪʃɪŋ       | ɪ̱ɟɪŋ̱      | t̪ɪ́l   | hair  | kɪ́nɪ́ | doors |
| e     | ɛʃí        | bɛrɪ       | bɪje   | beer  |
| e     | eʃen       | ɪ̱̱ɛ̱ṟṟe̱ | bɛle   | sesame|
| u     | ʊ̱nʊ̱      | ʃu̱t̪ɪ́     | ʊ̱ɡʊ́    | big   |
| o     | óndọ̱      | ɪ̱ḵo̱ḻ     | ʊ̱d̪ʊ̱    | woman |
| ɔ     | ɔmʊ̱ḻ     | ɪ̱ḵɔ̱ṟɛ́   | ʊ̱ṉɪ̱    | near  |
| e     | ɛnɛṉ     | ɛnɛṉ     | ɛnɛṉ   | mother|
| u     | unʊ̱      | ʊ̱nʊ̱      | ë̱ḵë̱m̱ | kite  |
| o     | óndọ̱      | ɪ̱ḵo̱ḻ     | ʊ̱d̪ʊ̱    | woman |
| ɔ     | ɔ́mʊ̱ḻ     | ɪ̱ḵɔ̱ṟɛ́   | ʊ̱ṉɪ̱    | near  |
| e     | eɡiḻ     | eɡiḻ     | eɡiḻ   | today |
| e     | eɡiḻ     | eɡiḻ     | eɡiḻ   | today |
| u     | ʊ̱nʊ̱      | ʊ̱nʊ̱      | ë̱ḵë̱m̱ | kite  |
| o     | óndọ̱      | ɪ̱ḵo̱ḻ     | ʊ̱d̪ʊ̱    | woman |
| ɔ     | ɔ́mʊ̱ḻ     | ɪ̱ḵɔ̱ṟɛ́   | ʊ̱ṉɪ̱    | near  |
| e     | eɡiḻ     | eɡiḻ     | eɡiḻ   | today |
| e     | eɡiḻ     | eɡiḻ     | eɡiḻ   | today |
| u     | ʊ̱nʊ̱      | ʊ̱nʊ̱      | ë̱ḵë̱m̱ | kite  |
| o     | óndọ̱      | ɪ̱ḵo̱ḻ     | ʊ̱d̪ʊ̱    | woman |
| ɔ     | ɔ́mʊ̱ḻ     | ɪ̱ḵɔ̱ṟɛ́   | ʊ̱ṉɪ̱    | near  |

Table 12a. Vowel harmony [-ATR]

| i     | e     | a     | ɔ     | u     |
|-------|-------|-------|-------|-------|
| ɪ̱t̪ɪ́m̱ | bɪḵe | ɪ̱g̱a̱ | ɪ̱d̪o̱ | ɪ̱t̪u̱ |
| dove  | worms | fire  | eight | louse |
| e     | bɪḻe | ɛ́dάŋ̱ | dɛ́dʊ́ | cloud |
| a     | ɔṟt̪ɪ́ | tɑ̱ṟe | ara   | áttʊ́ |
| sheep | plate | rain  | fish  | wing  |
| c     | ʊ̱ṉɪ̱ | ʊ̱ḵṟɛ́ | ʊ̱d̪a | ʊ̱ṟɛ́d̪ʊ́ | ʊ̱ḵṟu̱ |
| grass | leprosy | tool | near | shoe |
| u     | ʊ̱ṟɛ́ | kʊṉd̪a | kʊ́t̪ʊ́ | stone |

Table 12b. Vowel harmony [+ATR]

| i     | e     | ə     | o     | u     |
|-------|-------|-------|-------|-------|
| ɪ̱ṟi̱d̪i̱ | bɪj̱e | tɪ̱d̪ʊ́m̱ | ɪ̱ṟú | i̱ṟú |
| canoe | beer  | ostrich | sea  |
C. Syllables and prosody

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

| Syllable Type | Example | Meaning |
|---------------|---------|---------|
| CV            | t̪i     | cow     |
| V             | ëː      | we      |
| VC            | òŋ      | year    |
| CVC           | kəl     | house   |

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

| Syllable Type | Example | Meaning |
|---------------|---------|---------|
| CV.CV         | bɛ.lɛ   | sesame  |
| CV.CVC        | ka.ɽɔl  | fish    |
| CVC.CV        | kɔr.ʈu  | shoe    |
| CVC.CVC       | wər.til | sheep   |
| VC.CV         | on.do   | donkey  |
| VC.CVC        | òŋ.ɡɔl  | road    |
| V.CV          | u.ɳi    | grass   |
| V.CV          | i.ɾiŋ    | canoe   |

The combination V.V is lacking. In [ɪja] “neck” and [kʊwa] “kitchen,” the intervocalic approximant is arguably inserted as a transitional sound following /i/ and /u/, 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 [kʊ.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.

|     | long  | short |
|-----|-------|-------|
| i   | biː   | ɨi   |
| (e) | ɛː    | ɛ̂ː   |
| a   | tɔː   | ɔː   |
| o   | oː    | dɔː   |
| u   | ŋː    | ŋː   |
| uu  | kuː   | kuː   |

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.

Table 16. Possible tone contrasts

|     | high          | low          |
|-----|---------------|--------------|
| tɛː | grinding      | tɛː          |
| kâː | after me      | kâː          |
| kâː | stone         | kâː          |
| ŋː | relative      | ŋː          |

|     | high          | low          |
|-----|---------------|--------------|
| kâː | louse         | ŋː           |
| kâː | stone         | ŋː           |
| ŋː | relative      | ŋː           |
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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.

| phoneme | letter | example | gloss  |
|---------|--------|---------|--------|
| a       | a      | aninga  | drum   |
| b       | b      | bul     | dog    |
| c       | c      | ticcu   | five   |
| d       | d      | dotu    | horn   |
| d̪      | dh     | bidhidh | bat    |
| e       | e      | edang   | leaf   |
| ẽ       | ē      | ēsī     | hand   |
| g       | g      | egi     | goats  |
| i       | i      | igga    | fire   |
| ĩ       | ĕ      | tī      | cow    |
| j       | j      | jadhu   | tongue |
| k       | k      | kūdhü   | mountain|
| kw      | kw     | kwosa   | stone dish |
| l       | l      | kël     | house  |
| m       | m      | omul    | elephant |
| n       | n      | nonthu  | moon   |
| ng      | ng     | kirang  | drum   |
| ny      | ny     | irīny   | scorpion |
| o       | o      | or      | tree   |
| ö       | kël    | house   |
| p       | p      | ip      | tail   |
| r       | r      | ara     | rain   |
| r̥       | rh     | tarhum  | tortoise |
| s       | s      | usi     | hand   |
| t       | t      | turundu | chameleon |
| th̥      | th     | thūrī   | pot    |
| u       | u      | ulca    | ear    |
| ü        | ünütü | star    |
| w       | w      | wartil  | sheep  |
| y       | y      | yadu    | 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, based on the phonologies of Deleny or Dilling [dil], Kar-

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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.\(^\text{10}\) 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,\(^\text{11}\) 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.\(^\text{12}\) 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.”
Kadaru-Kurtala Phonemes

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 [±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 Ibrahim & Huttenga, “The Phoneme System of Tagle.”
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