

ì-bejì LML	'twins'	< -bí èjì H LL 'give birth to two'
ì-tanràn LML	'settlement of a case'	< -tán òràn H LL 'finish dispute'

To my knowledge, Àkàn, Hausa and Gbè lack comparable examples.

19. Ámayo's pitch notation (e.g. 1983, 185) does not show initial L-raising, but Melzian pointedly apologises for a "simplification of tone marking" obscuring the fact that "[a] low tone is frequently raised before a high tone..." (1937, xiii). Cf. also Elugbe (1977).
20. The [+ ] of (4b) is attested in many western Ìgbo varieties (e.g. Hyman & Schuh 1974, 89).
21. Thanks to A. Nevins for this comparison.
22. The samples compared are not controlled and the generalization is stated informally but the contrast is undeniable.
23. Cf. note 17 above.
24. A conversation overheard in a quiet *búkà* in downtown Òweré (= colonial "Owerri") in 1984 produced in me the uncanny impression that Ìgbo was being spoken with non-Ìgbo words, but my fellow diners' eavesdropped language turned out to be Ìbibio. A test for the phonation of trochaic footing can perhaps be devised in those Ìgbo varieties with the richest consonantal inventories (Ladefoged & al. 1976).
25. The lexicalization of D in these 'bare noun' languages is arguably null but its referential content is reinforced periphrastically by adjoined, phrase-final appositive modifiers like *lá* in (1), as in Ajíbóyè's analysis of Yorùbá *náà* (2005, 218). Alternatively, Aboh generates *lɔ*—the Gùngbè counterpart of Èwè *lá*—directly in D (2004, 83), but then the only way to obtain observed linear orders like *távò lɔ lɛ* 'the tables' (2004, 77) from the assumed [*lɔ* [*lɛ* [*távò*]]] is by raising different cartographic layers by arbitrarily different types of linearization, whose status in minimalism is anyway unclear. Consistent Kaynean antisymmetric movements alias snowballs would have been expected to strand D in final position, giving ungrammatical \**távò lɛ lɔ* unless the last step is diacritically marked as SPEC-to-SPEC excorporation, and such a kludge merely restates the problem without added insight.
26. *translation*: Drummed utterances can rightly be held to express how speakers perceive, if not conceive, and in any event interpret, the system of tones in operation when they speak.
27. *translation*: variations of intensity are more typical of stress and intonation than they are of tone.

## Proposals for a Tone Orthography of Nikyob following a Participatory Workshop

Timothy Kempton<sup>1</sup>

*Report<sup>2</sup> from the tone orthography workshop, Jos, Nigeria, 18 May to 12 June 2015, led by Dr Constance Kutsch Lojenga. Nikyob language consultants and co-researchers were David Sonkori, Dushe Haruna<sup>3</sup> and Jerry Peter Marcus. We are grateful to those people who provided helpful feedback on earlier drafts of this report especially Coleen Starwalt and an anonymous reviewer.*

**A**bstract  
The level of literacy in the Nikyob language is currently very low. Nikyob is a tone language, yet tone distinctions are not currently being represented in the orthography. It was suspected that this lack of tone marking was a factor in the low literacy rate but it was difficult to be conclusive because research into Nikyob phonology and orthography, especially in the area of tone, was limited. In order to investigate and help to address these issues, members of the Nikyob community took part in a participatory workshop on tone. The speakers categorised nouns and verbs by their tone patterns as well as observing changes that occurred when these words were included in simple grammatical structures. The analysis shows that tone has a high functional load in the language with many words distinguished by tone exclusively. Most of these are grammatical differences between words. For example, tone is the only feature to distinguish most plural nouns from singular nouns and some verb tenses are also only distinguished by tone. The current orthography guidelines suggest the use of accent marks to indicate tone levels when the text is otherwise ambiguous. However, due to tone complexity, both writers and readers find the guidelines difficult to implement and so the accents are no longer written. This paper showcases the workshop proposal to mark selected grammatical tone distinctions using a prefix symbol for the affected word. The proposal has undergone initial testing and has received support from orthography stakeholders in the community.

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<sup>2</sup> The online version of this report with audio examples can be found at [https://speechchemistry.github.io/faa/nikyob\\_tone](https://speechchemistry.github.io/faa/nikyob_tone) and the SIL Language and Culture archives.

<sup>3</sup> Dushe Haruna is one of the Nikyob speakers and has consented to the inclusion of his voice recordings in the online version of this report.

## Introduction

### Genetic affiliation and language location

Nikyob is a Plateau language spoken in the south of Kaduna State, Nigeria. The classification within Benue-Congo is Plateau, Southwestern, A (Simons & Fennig, 2018) or alternatively Plateau, Ninzic (Blench, 2018). The full name is Nikyob-Nindem (ISO693-3 code kdp) covering the two main dialects. Nindem is reported to vary slightly from Nikyob but the words are similar (Kadima & Jerzyk, n.d.) and the Nindem are said to generally understand Nikyob (Goback & Hon, 2015). Within Nikyob itself there are two dialects: Turan and Nbetcho. There is mutual intelligibility but some sound differences do occur<sup>4</sup> (Shibiya, 2004). Turan is frequently used as the reference dialect, and often regarded as the prestigious dialect (Markus, 2011).

### Background to the workshop

Despite a number of attempts to boost literacy in the Nikyob language, the amount of reading and writing remains very low. Testing by the Nikyob Bible translation and literacy project confirms this as well as language vitality assessments (Kempton, 2016b; Simons & Fennig, 2018). It was suspected that a lack of tone marking was a factor in the low literacy rate. An initial literacy primer (Kadima, 1989) did not include any instructions for writing tone but a more recent guide suggests writing tone with accents marks when “context cannot remove an ambiguity” (Longtau, Mandue, Adewara, & Barau, 2008). However, tone marking has not been observed in practice. Blench (2005b) indicates that tone plays an important role in distinguishing words in Nikyob, but no comprehensive study of the Nikyob tone system has been undertaken to date.

The need for more research in this area led to a participatory workshop in 2015 to investigate the role of tone in Nikyob, and to make suggestions for improving the orthography. The results are presented in this paper.

During the workshop we concentrated on parts of the writing system where ambiguity arises in the current orthography because of tone. Due to the brevity of the workshop, a minimum amount of data was collected to give sufficient confidence in each paradigm e.g. the past tense. This has meant there is a paucity of data in certain areas, so that some of the phonological hypotheses are tentative. More data will need to be collected to confirm these hypotheses.

<sup>4</sup> For example many words that end with [d] in Turan e.g. [rwad] “house” end in [s] in Nbetcho e.g. [rwas].

We recognise that there is a range of different viewpoints regarding orthography development. At one end of the spectrum is the viewpoint that the vast majority of linguistic problems should be resolved before developing an orthography. At the other end of the spectrum is the viewpoint that the community should be using an orthography as soon as they possibly can. With limited resources we have attempted to navigate somewhere between these two viewpoints. This hasn't always worked perfectly but the aim is an iterative approach where the most pressing linguistic issues are investigated, and then the proposals are subsequently tested. This then feeds back into further linguistic investigation.

### Transcription conventions

The transcription in this report uses the following conventions:

- square brackets for [phonetic] data
- forward slashes for /phonemic/ data
- angled brackets for <orthographic> data.

However in most tables brackets are removed for ease of reading and comparison. In these tables the surface tone is written before the orthographic representation e.g. ɬ yon is shorthand for [ɬ]<yon>. Chao tone letters from the IPA are used to indicate surface tone. A phonetic representation of tone is used alongside an orthographic representation of segments because the workshop encouraged participants to write down words, whereas tone was elicited separately. As Nikyob speakers became more conscious of the tones in their language it became apparent that the distinctions they were making were primarily phonemic but with some additional phonetic detail.

### Orthography decision makers

Primary decision makers in orthography matters include the language committee and literacy subcommittee of the Nikyob Bible translation and literacy project. Other potential stakeholders include the Kaninkon Development Association and the Kaninkon Traditional Council as well such as the family of Hauwa Kadima (who wrote the first literacy primer in 1989).

### Spelling of Nikyob

The exact spelling of the Nikyob language as written by the Nikyob people has varied in the past and is a good example of the way the orthography has changed. The spelling <Ninkyoob> was used in the introductory pages of the first literacy primer (Kadima, 1989). This reflects early orthography recommendations that double vowels be used to indicate a different vowel quality from a single letter (Kadima & Jerzyk, n.d.). However the core material of the very same primer reflected a different convention that one

symbol be used for each vowel quality. This is why the front cover of the primer reads <Ninkyob>.

In 2008 a Nikyob orthography workshop was held that produced a reading and writing guide. The spelling <Nikyob> using the nasalisation diacritic on the front cover, presumably reflects the recommendations of the workshop: that “the [nasal] symbol is preferred over the use of special -n because final -n is permitted in the language”. However this nasal symbol has not always been straightforward to produce (e.g. see Figure 1). Most publications and signs currently do not use the nasalisation diacritic (e.g. see Figure 2). The use of tone diacritics in Nikyob orthography is even rarer and in fact the only publication we have seen them in is the reading and writing guide (Longtau et al., 2008).

It is, of course, possible that the spelling of Nikyob may change again in the future.

## Nĩ kyob Bible Translation / Literacy Project

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Jema'a L. G. C. Kaduna State

Figure 1: Reproducing the nasalised vowels has been a challenge



Figure 2: Sign demonstrating that the current spelling of the language is “Nikyob”

### Segmental issues and syllable structure

#### Consonants

The following table shows our current understanding of the consonant phonemes.

	Bilabial	Labiodental	Alveolar	Palatal	Velar	Labial-velar	Glottal
	p b		t d	(c)(ɟ)	k g	kp gb	
Plosive			n	(ɲ)	ŋ	(ŋɔ̃ <sup>w</sup> )	
Nasal	m						
Fricative		f v	s z	ʃ ʒ	(ʎ <sup>w</sup> )		
Trill			r				
Tap			ɾ				
Approximate				j		w	
Lateral			l				

This table is the same as Blench (2005b) except that consonants in parenthesis are those suggested by Roger Blench that we regard as being labialised or palatalised versions of more elemental sounds just as most of the other consonants can be labialised and palatalised. This includes the “explosive m” [ŋɔ̃<sup>w</sup>], a click which Harley (2012) suggests to be a variant pronunciation of /m<sup>w</sup>/ for some speakers.<sup>5</sup> The palatal plosives have been observed as [tʃ] and [dʒ] and appear to be /tj/ and /dj/ underlyingly (see the section on future tense in the appendix). We have seen no evidence of [ʎ] occurring on its own; it is only observed in a labialized form. Whether this sound [ʎ<sup>w</sup>] also accounts for the “w with frication” that Blench (2005b) describes is unknown. It may be that [ʎ<sup>w</sup>] is just an allophone of /g<sup>w</sup>/ - this hypothesis is currently under investigation.

All the above consonants without parentheses can be palatalised or labialised except the trill /r/ and the fricatives /ʃ/ and /ʒ/ (Blench, 2005a). It is possible the latter two sounds could be regarded as palatalised versions of /s/ and /z/ respectively, however the sequence <sy> does seem to occur as well e.g. <nsyen> “bean”.

The existing orthography needs some further work in the area of consonants. Although the 2008 orthography workshop (Longtau et al., 2008) made some important contributions in the documentation and grammar of Nikyob, which this paper relies on, it remains to be seen whether the revision of Nikyob consonants was optimal<sup>6</sup>. At the very least, further orthography testing is needed to confirm the most intuitive representation of these consonants for Nikyob speakers.

<sup>5</sup> An alternative perspective is that this click is a variant pronunciation of /ŋm<sup>w</sup>/ (Harley, M. (2016) personal correspondence).

<sup>6</sup> For example the workshop reported in (Longtau et al., 2008) used <shw> to replace <khwy> (Kadima, 1990) for representing the voiceless laminal-palatal labialised fricative. The 2008 workshop also used <ch> to replace the <ty> (Kadima, 1990) for the voiceless postalveolar affricate - the section on future tense in the appendix gives some justification for Kadima's original <ty> digraph.

## Vowels

	Front	Central	Back
Close	i		u
Mid-close	e		o
Mid-open	ɛ		ɔ
Open		a	

Nasalisation is contrastive for all the vowels except /e/ and /o/, this results in 5 nasalised vowels (Blench, 2005b; Kadima & Jerzyk, n.d.). Vowel length does not appear to be contrastive. When differences in vowel length have been observed, there has been no evidence that it is independent from the tone level, i.e. vowel length appears to be a phonetic correlate of tone.

The treatment of vowels in the existing orthography makes use of the nasal diacritic with 12 vowels written as <i, e, ɛ, a, ɔ, o, u, ĩ, ĕ, ã, ẽ, û>. It is hoped that the increasing availability of technology to add the nasal diacritic (e.g. smartphone keyboards) alongside literacy teaching will encourage people to write nasal vowels.

## Syllable structure

The following syllable structures appear in Nikyob. Unambiguous examples are shown below each structure from fieldwork by Markus (2011). The different source of data is the reason that these are phonetic transcripts. A few changes have been made to the original data following tests with Nikyob speakers.

V

[ɪ i] yes

[Nɛʔɛ] no

CV

[ɪ ta] take

VC

[ɪ ar] grandchildren

CVC

[ɪ paɪ̃] all

[ɪ buɪ̃] open

CVCC

[ɪ taɪ̃] nine

[ɪ ɪ ɲsɪɪ̃] gizzard

There appear to be three syllabic nasals:

[m] [ɪmbwɛr] tomorrow  
 [ŋ] [ɪŋhɪur] crowd  
 [ŋ] [ɪŋgun] fishing line

In these unambiguous examples, there is only a single consonant in the onset of every syllable. Also the nucleus of every syllable is either a single vowel or a syllabic nasal. This suggests that palatalization and labialisation occurring between the onset and the vowel are just features acting on a single consonant onset. Therefore it is a good existing practice that <w> and <y> are written after the consonants rather than <u> or <i> e.g. <mbwɛr> for "tomorrow".

In the course of the workshop we did not notice any difference in tone behaviour between closed and open syllables. However we did notice that only level tones occurred on syllabic nasals.

## Nikyob alphabet

An investigation of the words that appear in Kadima (1989) suggests the following mapping of phonemes to letters for the original Nikyob alphabet:

Phoneme	A	b	d	e	ɛ	f	g	gb	h	i	ɜ	k	kp	l	m	n	ŋ	o	ɔ	p	r	r	s	ʃ	t	u	v	w	j	z
Letter(s)	A	b	d	e	ɛ	f	g	gb	h	i	j	k	kp	l	m	n	ng	o	ɔ	p	r	rr	s	sh	t	u	v	w	y	z

Note that Kadima represents the phoneme /ɜ/ with the letter <j>. One problem with this approach is that most Nikyob speakers strongly associate the sound [dɜ] with the letter <j> because they are literate in English and/or Hausa. Since [dɜ] is often a realisation of /dy/ in Nikyob, a number of Nikyob speakers represented both /ɜ/ and /dy/ with the letter <j>. This caused confusion. Representing /ɜ/ completely differently, using the digraph <zh> helped to reduce the confusion. Other minor changes to Kadima's orthographic representations are suggested in Kempton (2016a).

## Summary of tone system

## Number of tones

In isolated words there appears to be three level tones: low, mid and high which can be labelled with the Chao tone letters [ɿ ɨ ʔ]. There are also tone contours: low-mid rise, mid-low falling and high-mid falling which can be labelled [ɿ ɨ ʔ]. Three monosyllabic words for each surface tone are given in the following table as an example.



Word	Gloss	Word	Gloss	Word	Gloss
ɿ kyom	to look after	ɿ num	drought	ɿ rig	God
ɿ kyom	navel	ɿ za	to buy	ɿ she	egg
ɿ kyom	corpse	ɿ za	season	ɿ yud	sand
ɿ yon	goat	ɿ kyar	monkey	ɿ yud	dew
ɿ zig	knife	ɿ kpo	granary	ɿ rig	rope
ɿ re	stomach	ɿ za	leg	ɿ tyo	head

The tone contour [N] has been observed on past tense verbs. In longer utterances we have observed more than three levels of tone. More research is needed to confirm the reason for this.

### Underlying levels

There appears to be three contrastive level tones in isolation forms. One possible interpretation of the patterns observed at the workshop is that there are just two underlying tones in Nikyob but more than two realizations of these tones in the speech of people. These realizations or surface tones arise through processes called downstep and upstep. Downstep occurs when a high tone is realized as a slightly lower tone than a previous high tone. This would sound like a high tone followed by a mid tone. If this process is completely predictable because it is caused by a high-low-high sequence of tones, for example, it is called "automatic" downstep. However, if it is not predictable, it is called "non-automatic" downstep. Non-automatic downstep typically occurs because there is a low tone that is in the mind of the speaker but not pronounced directly. Rather it makes its presence known by causing the high tone to be pronounced slightly lower. A tone that is in the mind of the speaker but not pronounced is called a floating tone. A two tone interpretation of Nikyob would suggest a non-automatic downstep: a floating low tone causes a following high tone to be pronounced lower. Upstep is like downstep except in this case the high tone is pronounced extra high after a low tone that is not pronounced by the speaker. This kind of upstep appears to occur in Nikyob with a two tone interpretation.

This hypothesis is based on observations and suggestions of Dr Constance Kutsch Lojenga at the tone orthography workshop. The data used in this report is primarily isolated words and short phrases so there is limited evidence presented here for the hypothesis of downstep and upstep.

Surface forms and the hypothesised underlying tones are shown below (L = Low, fL = floating Low, H = High). An example of upstep is shown in the third row. Evidence of non-automatic downstep is given in the section on object pronouns in the appendix. However more data, particularly data from longer utterances is needed to lend more support to this hypothesis of two underlying tones.

Surface	Underlying
ɿ	L
ɿ	H
ɿ	H fL
ɿ	L H
ɿ	H L
ɿ	H fL H

### Tone patterns on nouns

The noun class system of Nikyob is more eroded than most of the other Plateau languages (Gerhardt, 1989). For many nouns it is difficult to identify the noun class and how this may correlate with tone patterns. At least one class of words in Nikyob displayed a fairly restricted set of tone patterns. We focused more on this class of nouns than other noun classes for this report. These are the nouns characterised by two syllables where the first syllable is a syllabic nasal prefix. For example the tone patterns for singular and plural forms respectively are:

	Singular	Plural	Example	Gloss
1.	ɿ ɿ	ɿ ɿ	Mpad	bag
2.	ɿ ɿ	ɿ ɿ	Nkum	log
3.	ɿ ɿ	ɿ ɿ	Nkim	path
4.	ɿ ɿ	ɿ ɿ	Nkyul	hip
5.	ɿ ɿ	ɿ ɿ	nsher	star
6.	ɿ ɿ	ɿ ɿ	nsh5	bee

Note that for tone group 1, the plural tone pattern matches the singular tone pattern of group 2 and vice versa. The same is true for pattern 3 and 4. Most of the singulars and plurals in this syllabic nasal prefix class are tone minimal pairs e.g. <nkum> "log" in group 2 has the same segments whether singular or plural. However some words also in group 2 change segmentally when pluralised e.g. [ɿ ɿ] <nzwob> "big hoe", has the plural [ɿ ɿ] <nzyob><sup>7</sup>.

### Tone patterns on verbs

Due to workshop time limits, only single syllable verbs were investigated for tone. Five tones were observed (the [N] tone being the only tone not

<sup>7</sup> This labialisation and palatalisation may be a vestige of earlier noun class prefixes that have now been incorporated into the root. There is some evidence for this in the language of Kuce (which like Nikyob is a Plateau-Southwestern-A (Simons & Fennig, 2018) or Plateau-Ninzic (Blench, 2018) language). The corresponding word in Kuce is [ɿ ɿ] <uhup> "big hoe" which has the plural [ɿ ɿ] <ihup>, which retains the noun class prefixes which may be closer to the proto form (Starwalt, C. (2016) personal correspondence). (Gerhardt, 1989, p366) observes a similar sound change in nouns when comparing Nindem and Nikyob, with Nindem retaining the noun class prefix.

observed), the verbs here illustrating each tone pattern are given in their imperative form.

Verb	Gloss	Verb	Gloss
ɪ tɔ	see	ɪ hag	slaughter
ɪ nog	give	ɪ ta	take
ɪ re	speak	ɪ sorl	run
ɪ yarl	till the soil	ɪ yam	fear
ɪ tĩ	add	ɪ fũ	add more

### Tone stability

The Nikyob language shows more tone stability than most of the other Plateau languages at the workshop. We present here a summary of the tone stability, *more details and examples are shown under the relevant sections in the appendix.*

We observed no tone changes when nouns were combined with prepositions (i.e. the preposition coming between two nouns). When nouns were combined with demonstratives there was a small change to the noun - the tone [ɪ] changes to [ɪ] in the final syllable of the noun. Possessive pronouns occur after the noun and their tone is influenced by the tone of the noun. There is occasionally a change of tone in the noun that is identical to the change that was observed with demonstratives.

When conjugating verbs, the pronouns remain stable but the tone on the verbs often change, being influenced by the tone on the preceding pronoun. This was certainly the case for the present tense and future tense. For the past tense there was some neutralisation probably from the past tense morpheme, so it was harder to make conclusions. More investigation is needed. We also tested for negation of verbs in the present tense. The pronouns did not change nor did the negation morpheme. However the verb did change, apparently influenced by the tone on the preceding negative morpheme. When object pronouns were placed after the verb, neither the verb nor the object pronoun changed. This was certainly the case for the present and future tense. For the past tense, again neutralisation had an impact. Further details on all these patterns can be seen in the appendix.

So it appears that tones show a high degree of stability but where tone does influence neighbouring words its influence spreads from left to right.

### Suggestions for orthography improvement

#### Description of existing tone orthography

Conventions for dealing with tone in the existing orthography are described in Longtau et al. (2008):

"In most cases, when a word occurs in the context of a sentence, speakers of the language will recognize the meaning of the word and will read it with the correct tone. When the context cannot remove an ambiguity, it may be necessary to mark the tones. (p5)"

"... with the additional proviso that the tone of plural nouns must be marked fully. (p17)"

### Plurals

Many plural noun forms differ from the singular only in tone. This creates an ambiguity in the orthography. For example, consider the sentence <mĩ tɔ kiky> "I see chicken". If the differences expressed through tone are not marked it is not clear if <kiky> "chicken" is singular or plural.

A random sample taken from a 1700 wordlist suggests that over 50% of plurals differ only in tone from the singular form. This seemed to be a larger proportion than average for Plateau languages when compared to those languages at the tone workshop (Iten, Gworog, Koro Waci, Kuce).

There are two main options to deal with this ambiguity. Firstly tone accents could be used to mark the difference in tone. This is the recommendation from the 2008 workshop (Longtau et al., 2008, p17), where tone is only used on the plural form. As mentioned earlier, such tone marking has not been observed in practice. Speakers find it difficult to write. The other option does not involve explicitly marking tone differences. Rather, a symbol can be used to mark the plural form. This is our recommendation from the 2015 workshop. The use of symbols, such as punctuation, to mark grammatical differences in tone languages was pioneered in Africa in the 1960s and continues to be developed by language communities and orthography experts (Bird, 1999; Kutsch Lojenga, 2014; Roberts & Walter, 2012). The symbol we are currently experimenting with is a star but it could be any other symbol. Further investigation is needed to discern whether this is the most appropriate symbol from a literacy perspective as well as a technology perspective. The key issue here is using a symbol for marking grammatical tone, not the particular symbol used, which can be chosen through further community testing. Examples comparing the two options for marking plurals are shown in the table below. The first column shows the unmarked form which is used for the singular in both approaches.

## Two ways of representing plurals in the orthography

Gloss	Singular	Tone accents (2008)	Grammatical symbol (2015)
chicken	kikyɔ	kíkyɔ̌	*kikyɔ
Bag	Mpad	m̄paḍ	*mpad
Log	Nkum	ṅkùm	*nkum
mountain	gbyo	Gbyó	*gbyo
chameleon	ntod	ntód	*ntod

During the tone workshop, an experiment was conducted to measure the effectiveness of marking tone accents compared with grammatical marking. This is very similar to examples in the table above (except when testing tone accents, the accents were used on *both* the singular and the plural e.g. <kíkyɔ̌> "chicken", <kíkyɔ̌> "chickens"). At the time of writing this paper, the full analysis of the experiment is yet to be complete but initial results indicate that it is easier to read the plurals that are marked grammatically, than those marked with tone diacritics e.g. it is easier to read <\*kikyɔ> rather than <kíkyɔ̌>.

For the nouns that only differ in tone between singular and plural, this will clearly help. But what about the minority of nouns that already differ segmentally? These could be left unmarked but we recommend they still be marked explicitly. The reasons are primarily for writing. Firstly if only some plurals are marked then the writer will briefly hesitate before writing the plural to decide if it should be marked or not. However if all plurals are marked then there will be no hesitation. Secondly this approach is recommended by an expert in Nigerian orthographies<sup>8</sup>, and thirdly it fits with the recommendation of the 2008 workshop that indicates that all plurals should be marked (Longtau et al., 2008, p17).

## Possessive pronouns with emphasis

Possessive pronouns by themselves are not ambiguous in the current orthography but ambiguity arises when emphasis is added.

Word	Gloss
ɪ ɪ mini	that yours
ɪ ɪ mini	that yours(pl)
ɪ ɪ mani	that his
ɪ ɪ mani	that theirs

The 2nd person and the 2nd person plural are only distinguished by tone. In the same way the 3rd person and the 3rd person plural are only

distinguished by tone. The way this should be marked in the orthography is still under discussion<sup>9</sup>.

## Independent pronouns

The normal subject pronouns that occur before verbs do not have any ambiguity in the way they are written but independent pronouns do. Although independent pronouns do not have a direct equivalent in English, an equivalent gloss has been added to the following table:

ɪ mī	I	ɪ tod	we
ɪ wo	You	ɪ ɪ nzhin	you(pl)
ɪ wo	he/she/it	ɪ ba	they

Note that 2nd and 3rd person singular independent pronouns are only distinguished by tone. We propose that they be written orthographically as <wo> and <wó> respectively. Note that this diacritic is not informing the speaker of the absolute value of the tone, rather it is a grammatical symbol to signal the third person.

## Object pronouns

Object pronouns in Nikyob are as follows:

ɪ ɪ	Me	ɪ tod	us
ɪ o	You	ɪ ɪ nzhin	you(pl)
ɪ o	him/her/it	ɪ ba	them

Note that 2nd and 3rd person singular object pronouns are only distinguished by tone just like the independent pronouns. We propose that they be written orthographically as <o> and <ó> respectively. As with the independent pronouns, the diacritic is a grammatical symbol indicating the third person to resolve any ambiguity.

## Past tense

The past tense form of a verb is segmentally identical to the present tense and only differs by tone. The only other tenses that have been investigated are the present tense and future tense (see appendix). Further study is needed to determine how this tense might be linked to other TAM (tense-aspect-mood) markers and whether other TAM markers are purely distinguished by tone. Here is a conjugation of a verb in present tense as an example:

<sup>9</sup> Originally the proposal was that the plural pronouns are marked in a similar fashion to the plural nouns. For example <\*mini> "that yours" and <\*mani> "that theirs". However the proposal for nouns was that all plural nouns would be marked whether or not they are a tone minimal pair. To be consistent all plural pronouns should be marked as well but this would seem to be excessive.

<sup>8</sup> Harley, M. (2015) personal correspondence.

	J tɔ	to see (present)			
ɪ mī	ɪ tɔ	I see	ɪ ti	ɪ tɔ	we see
ɪ wo	ɪ tɔ	you see	ɪ ni	ɪ tɔ	you(pl) see
ɪ a	ɪ tɔ	he/she/it sees	ɪ ba	ɪ tɔ	they see

Here is the same verb in past tense:

	J tɔ	to see (past)			
ɪ mī	ɪ tɔ	I saw	ɪ ti	ɪ tɔ	we saw
ɪ wo	ɪ tɔ	you saw	ɪ ni	ɪ tɔ	you(pl) saw
ɪ a	ɪ tɔ	he/she/it saw	ɪ ba	ɪ tɔ	they saw

It can be observed that the change to the past tense also effects some of the pronouns. The identical tone patterns in the past tense suggests a neutralisation of the tones. Along with the unusual high falling tone this verb form appears to be more marked at a phonological/morphological level. Further investigation of the full range TAM markers would be needed to confirm this. As an interim measure we propose to mark this verb form in the orthography to avoid any ambiguity between past and present tense. The proposal is that a symbol is inserted before the verb. We expect this should still be in the peripheral vision of the reader so they can anticipate the difference while reading the pronoun. Currently we are suggesting a colon to indicate past tense. This is placed directly adjacent to the following word without a space to avoid it being confused with a standard colon. For example <ɪ tɔ> for present tense and <ɪ:tɔ> for past tense. As with other grammatical symbols this could be revised through community testing.

### Lexical tone minimal pairs

During the workshop we collected a number of lexical tone minimal pairs, that is, where two words only vary by tone. Since we were looking for words that might be confused in the orthography, we did not include words from different word categories (e.g. we have not listed pairs where one word is a noun and the other word is a verb). This was not an exhaustive search and it is likely that more words will be found.

### Nouns that only differ in tone

	Word	Gloss		Word	Gloss
ɪ	Yud	sand	ɪ	yud	dew
J ɪ	Nggu	wind	ɪ ɪ	nggu	hair
ɪ	Za	leg	ɪ	za	season
J ɪ	nsher	star	J J	nsher	palm wine
ɪ	Kyom	navel	ɪ	kyom	corpse
J	Rig	God	ɪ	rig	rope

### Verbs that only differ in tone

	Word	Gloss		Word	Gloss
ɪ	rag	repair	ɪ	rag	plead
ɪ	su	shake	ɪ	su	break wind

Facilitators at the workshop who had a lot of experience with tone languages commented that this did not amount to many lexical minimal pairs and that it was unlikely to cause too much confusion in the orthography. This may need to be reviewed as more words are collected.

### Conclusion and the way forward

In this paper we have shown how the current use of the Nikyob orthography does not adequately represent all the necessary tonal distinctions in the language. This is especially the case for grammatical distinctions, for example tone being the only feature to distinguish most plural nouns from their singular counterpart. Proposals that emerged from the participatory workshop have been described. This includes the proposal to add a prefix symbol such as a star to a plural. At the workshop some initial literacy training material was created. Since then the proposal has undergone initial testing and has received support from orthography stakeholders in the community. Further linguistic investigation will take place while orthographic testing progresses.

### Appendix

#### Tone patterns on verbs

#### Present Tense

The normal subject pronouns for present tense are as follows

ɪ mī	I	ɪ ti	we
ɪ wo	You	ɪ ni	you(pl)
ɪ a	he/she/it	ɪ ba	they

When conjugating in the present tense, the tone on the pronouns remain stable but the tone on the verb can change slightly. Here is an example conjugation for the verb [J] <ɪ tɔ> "to see"

	J tɔ	to see			
ɪ mī	ɪ tɔ	I see	ɪ ti	ɪ tɔ	we see
ɪ wo	ɪ tɔ	you see	ɪ ni	ɪ tɔ	you(pl) see
ɪ a	ɪ tɔ	he/she/it sees	ɪ ba	ɪ tɔ	they see

It can be observed above that the verb [J] <ɪ tɔ> remains as the tone [J] after the pronoun [J] <a> but changes to the tone [ɪ] after all other pronouns.



This observation can be written as:

[J] VERB →	[J] VERB after [J] <a>
	[N] VERB after all other pronouns

Here is another example for the verb with a different tone [ɬ]

	ɬ nog	to give			
ɬ mĩ	ɬ nog	I give	ɬ ti	ɬ nog	we give
ɬ wo	ɬ nog	you give	ɬ ni	ɬ nog	you(pl) give
ɬ a	ɬ nog	he/she/it gives	ɬ ba	ɬ nog	they give

This can be written as:

[ɬ] VERB → [ɬ] VERB after all pronouns

For verbs with the tone [ɪ] the following example illustrates the pattern observed:

	ɪ rɛ	to speak			
ɬ mĩ	ɪ rɛ	I speak	ɬ ti	ɪ rɛ	we speak
ɬ wo	ɪ rɛ	you speak	ɬ ni	ɪ rɛ	you(pl) speak
ɬ a	ɪ rɛ	he/she/it speaks	ɬ ba	ɪ rɛ	they speak

This can be written as

[ɪ] VERB →	[ɬ] VERB after [J] <a>
	[ɪ] VERB after all other pronouns

There was a couple of exceptions (2 out of 8 verbs with the tone [ɪ]) e.g. [ɪ] "to cook" which appeared to show a slight difference:

[ɪ] VERB →	[ɬ] VERB after [J] <a>
	[ɪ] VERB after all other pronouns

This may be due to a different underlying tone pattern that is not revealed in the isolated form. More investigation is needed to confirm this.

The summary of patterns seen on all the verbs are shown below:

[J] VERB →	[J] VERB after [J] <a>
	[N] VERB after all other pronouns
[ɬ] VERB →	[ɬ] VERB after all pronouns
[ɪ] VERB →	[ɬ] VERB* after [J] <a>
	[ɪ] VERB after all other pronouns
[ɬ] VERB →	[ɬ] VERB* after [J] <a>
	[ɪ] VERB after all other pronouns
[ɪ] VERB →	[ɬ] VERB after [J] <a>
	[ɪ] VERB after all other pronouns

\* Exception for verbs with the tone [ɪ] (2 out of 8 verbs) e.g. [ɪ] <ru> "to cook": [ɪ] VERB → [ɬ] VERB after [J] <a>

\* Exception for verbs with the tone [ɬ] (1 out of 3 verbs) e.g. [ɬ] "growl":

[ɬ] VERB → [ɬ] VERB after [J] <a>

Past Tense

The normal subject pronouns for past tense are very similar to the subject pronouns for present tense. The segments are identical but the tones for past tense all become mid tone.

ɬ mĩ	I	ɬ ti	we
ɬ wo	You	ɬ ni	you(pl)
ɬ a	he/she/it	ɬ ba	they

The summary of patterns seen on all the verbs are shown below:

[ɪ] VERB →	[ɪ] VERB
VERB →	[N] VERB for all other verb tone classes

For example:

	ɪ ɬ	to see (past)			
ɬ mĩ	ɪ ɬ	I saw	ɬ ti	ɪ ɬ	we saw
ɬ wo	ɪ ɬ	you saw	ɬ ni	ɪ ɬ	you(pl) saw
ɬ a	ɪ ɬ	he/she/it saw	ɬ ba	ɪ ɬ	they saw

Future Tense

For future tense, the normal subject pronouns are also have identical segments when compared to present tense. The tones are different as follows:

ɬ mĩ	I	ɬ ti	we
ɬ wo	You	ɬ ni	you(pl)
ɬ a	he/she/it	ɬ ba	they

With future tense, the particle [ɪ] <i> is inserted between the pronoun and the verb. Also the first consonant of the verb root becomes palatalized, as the following table shows (pronoun not shown):

Present	Future	Gloss
ɬ hug	ɬ i ɬ hyug	burn
ɬ za	ɬ i ɬ zya	buy
ɬ yarɪ	ɬ i ɬ yarɪ	till the soil
ɬ ru	ɬ i ɬ ryu	cook
ɬ ɬ	ɬ i ɬ tyɔ	see
ɬ tā	ɬ i ɬ tyā	bite

Note that <ty> is pronounced [tʃ]. The pattern of palatalisation indicates why Kadima (1989) chose the digraph <ty> before the suggestion to replace it by <ch> (Longtau et al., 2008). As a more complete example, the verb [J] <ty> "to see" is conjugated as follows:

	J ty	to see (future)					
1 mĩ	1 i	J ty	I will see	1 ti	1 i	J ty	we will see
1 wo	1 i	J ty	you will see	1 ni	1 i	J ty	you(pl) will see
1 a	1 i	J ty	he/she/it will see	1 ba	1 i	J ty	they will see

The summary of patterns seen on all the verbs are shown below:

[J] VERB →	[J] VERB after all pronouns
[ɬ] VERB →	[ɬ] VERB after all pronouns
[ɭ] VERB →	[ɬ] VERB* after all pronouns
[ɰ] VERB →	[ɰ] VERB after all pronouns
[ɱ] VERB →	[ɱ] VERB after all pronouns

\* Exception for verbs with the tone [ɭ] (1 out of 4 verbs) e.g. [ɭ] <hug> "to burn":

[ɭ] VERB → [ɬ] VERB after all pronouns

### Negation

We investigated negation on tones in the present tense. A negation particle follows the pronoun. The only difference to the pronouns is the third person singular which has different segments and tone. The negation particle itself has a tone that is difficult to predict. The following fragments show the general pattern.

1 mĩ	1 ang	I don't	1 ti	1 ang	we don't
1 wo	1 ang	you don't	1 ni	1 ang	you(pl) don't
1 wo	1 ang	he/she/it doesn't	1 ba	1 ang	they don't

The following example shows how the tone on the negation particle can influence the tone on the verb:

	1 re	to speak					
1 mĩ	1 ang	1 re	I don't speak	1 ti	1 ang	1 re	we don't speak
1 wo	1 ang	1 re	you don't speak	1 ni	1 ang	1 re	you(pl) don't speak
1 wo	1 ang	1 re	he/she/it doesn't speak	1 ba	1 ang	1 re	they don't speak

The summary of patterns seen on all the verbs are shown below:

[J] <ang> [J] VERB →	[J] <ang> [J] VERB
[ɬ] <ang> [J] VERB →	[ɬ] <ang> [ɰ] VERB
[J] <ang> [ɬ] VERB →	[J] <ang> [ɬ] VERB
[ɬ] <ang> [ɬ] VERB →	[ɬ] <ang> [ɬ] VERB
[J] <ang> [ɭ] VERB →	[J] <ang> [ɬ] VERB
[ɬ] <ang> [ɭ] VERB →	[ɬ] <ang> [ɭ] VERB
[J] <ang> [ɰ] VERB →	[J] <ang> [ɰ] VERB
[ɬ] <ang> [ɰ] VERB →	[ɬ] <ang> [ɱ] VERB

### Object pronouns

Object pronouns in Nikyob are as follows:

1 i	Me	1 tod	us
1 o	You	1 ɱ nzhin	you(pl)
1 o	him/her/it	1 ba	them

For example:

[J] <a>	[J] <ty>	[ɬ] <i>
He	Sees	me

Following a similar structure to this example the general pattern that occurs after the third person [J] <a> is recorded as follows:

[J] VERB →	[J] VERB before all pronouns
[ɬ] VERB →	[ɬ] VERB before all pronouns
[ɭ] VERB →	[ɬ] VERB before all pronouns
[ɰ] VERB →	[ɰ] VERB before all pronouns

If verbs are in the future tense the object pronouns behave the same. For example:

[J] <a>	[ɬ] <i>	[J] <ty>	[ɬ] <i>
he	will	see	me

If verbs are in the past tense the object pronouns have different tones. When compared to the present tense, most object pronoun tones are one step lower (this could be due to non-automatic downstep but more data is needed to verify this hypothesis).

1 i	Me	1 tod	us
1 o	You	1 ɱ nzhin	you(pl)
1 o	him/her/it	1 ba	them

For example:

[ɬ] <a>	[ɭ] <ɔ>	[ɰ] <ĩ>
he	saw	me

Following a similar structure to this example the general pattern that occurs after the third person [ɰ] <a> is recorded as follows:

[ɰ] VERB →	[ɭ] VERB before all pronouns
[ɬ] VERB →	[ɭ] VERB before all pronouns
[ɭ] VERB →	[ɭ] VERB before all pronouns
[ɰ] VERB →	[ɭ] VERB before all pronouns

### Demonstratives

The common demonstratives are as follows:

ɬɔ	this / these
ɬɬɰɰɔ̃	that / those
ɬɬɬɬ iyoyo	yonder

When combined with the noun the demonstrative remains stable and usually the noun root remains stable e.g.

ɰɰ nkim	path	ɬɰ nkim	paths
ɰɰ nkim ɬɔ	this path	ɬɰ nkim ɬɔ	these paths
ɰɰ nkim ɬɬɰɰɔ̃	that path	ɬɰ nkim ɬɬɰɰɔ̃	those paths
ɰɰ nkim ɬɬɬɬ iyoyo	yonder path	ɬɰ nkim ɬɬɬɬ iyoyo	yonder paths

However if a noun ends in a mid-low falling tone [ɰ] then this changes to mid [ɬ] when combined with the demonstratives e.g.

ɬɬ nsag	spoon	ɰɰ nsag	spoons
ɬɬ nsag ɬɔ	this spoon	ɰɰ nsag ɬɔ	these spoons
ɬɬ nsag ɬɬɰɰɔ̃	that spoon	ɰɰ nsag ɬɬɰɰɔ̃	those spoons
ɬɬ nsag ɬɬɬɬ iyoyo	yonder spoon	ɰɰ nsag ɬɬɬɬ iyoyo	yonder spoons

### Possessive pronouns

Possessive pronouns were combined with nouns. As with all nouns the focus was on the well studied class of nouns characterised by two syllables where the first syllable is a syllabic nasal prefix. Here is an example for the word "path":

ɰɰ nkim	Path	ɬɰ nkim	paths
ɰɰ nkim ɰ mu	my path	ɬɰ nkim ɰ mu	my paths
ɰɰ nkim ɬ mi	your path	ɬɰ nkim ɬ mi	your paths
ɰɰ nkim ɬ ma	his path	ɬɰ nkim ɬ ma	his paths
ɰɰ nkim ɰ mod	our path	ɬɰ nkim ɰ mod	our paths
ɰɰ nkim ɰ min	your(pl) path	ɬɰ nkim ɰ min	your(pl) paths
ɰɰ nkim ɰ man	their path	ɬɰ nkim ɰ man	their(pl) paths

Some possessive pronouns realise the same tone. The possessive pronouns <mi, ma> have the same tone which is always [ɬ]. The possessive pronouns <mu, mod, man> have the same tone which varies between two tones: [ɰ, ɬ]. The following table shows this variation of these tones for words representing the different tone groups. The table shows the pronoun: <mu> "my". If there were tables showing the pronouns <mod> "our" and <man> "their", then the tones would be identical.

Singular	mu	Gloss	Plural	mu	Gloss
1. ɰɰ mpad	ɰ mu	my bag	ɬɬ mpad	ɰ mu	my bags
2. ɬɬ nsag	ɰ mu	my spoon	ɰɰ nsag	ɰ mu	my spoons
3. ɰɰ nkim	ɰ mu	my path	ɬɰ nkim	ɰ mu	my paths
4. ɬɬ nkyul	ɰ mu	my hip	ɰɰ nkyul	ɰ mu	my hips
5. ɰɰ njam	ɰ mu	my njam tree	ɬɬ njam	ɰ mu	my njam trees
6. ɬɬ nshɔ̃	ɰ mu	my bee	ɬɬ nshɔ̃	ɰ mu	my bees

(Note that 3 & 4 aren't exact opposites- see the mu morpheme) <min> shows its own pattern which varies between two tones: [ɰ, ɬ]:

Singular	min	Gloss	Plural	min	Gloss
1. ɰɰ mpad	ɰ min	your(pl) bag	ɬɬ mpad	ɰ min	your(pl) bags
2. ɬɬ nsag	ɰ min	your(pl) spoon	ɰɰ nsag	ɰ min	your(pl) spoons
3. ɰɰ nkim	ɰ min	your(pl) path	ɬɰ nkim	ɰ min	your(pl) paths
4. ɬɬ nkyul	ɰ min	your(pl) hip	ɰɰ nkyul	ɰ min	your(pl) hips
5. ɰɰ njam	ɰ min	your(pl) njam tree	ɬɬ njam	ɰ min	your(pl) njam trees
6. ɬɬ nshɔ̃	ɰ min	your(pl) bee	ɬɬ nshɔ̃	ɰ min	your(pl) bees

### Prepositions

The following prepositions were elicited:

Preposition	Gloss
ɬɬ ikyɔ̃g	under
ɬɬ ityo	on top (on head)
ɰɰ igyan	by
ɬɬ isin	beside (on tree trunk)
ɬɬ imwing	inside

Note the consistent occurrence of the prefix [ɬ] <i>. This appears to be a general locative morpheme.

Prepositions are placed between two nouns e.g.

[ɬ] <gyarɬ> [ɬ ɬ] <ikyo> [ɬ] <bang> "an axe under a bed"

In checking many different combinations of prepositions and nouns, no changes of tone were observed, indicating a high degree of tone stability for this construction.

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