

I am including this paper on the Sara-Bagirmi Project website,
as I believe that most of the data as
well as the general conclusions presented are valid.
However, many of the vowels in the Gulay data taken from
Keegan 1990 are not correct,
and the paper needs to be revised.

JMK, 2014

Sara Vowel System

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1. Introduction

This paper is concerned with the vowel system for the Sara Languages. My goals are twofold: first, to propose and justify a system of underlying vowels for the modern Sara languages, one involving a substantial reduction from the vowels found at the phonetic level. I will argue that a system of harmonic constraints operates throughout Sara, an understanding of which leads to a clearer picture of the underlying vowel system. I will then expand the scope of investigation to include related languages, especially Kenga and Bagirmi, in an attempt to find the beginnings of a historical/comparative explanation for proto Sara vowels. I will not deal here with nasalized vowels.

1.1 Sara Vowels:

At the phonetic level, the following vowels have been described in Sara languages:¹

(1)

i ɨ U u
 e ə o
 ɔ
 a

I propose here to reduce this to the following, slightly unbalanced system for Sara:

(2)

i u
 e o
 ɔ
 a

My primary argument for this is that the vowels [ɨ], [U] and the schwa [ə] are neutralized manifestations of other vowels. To understand why this is so, a basic understanding of syllabic and harmonic constraints upon Sara morphemes is necessary.

2. Harmonic Constraints in Morphemes: a Quick look at Mbay

The constraints on morphemes in Mbay, a Sara language spoken in the subprefecture of Moissala, are quite typical of those which constrain all Sara morphemes, and serve as a good starting point for discussion.²

2.1 Restrictions on Syllable structure of native morphemes:

The vast majority of morphemes in Mbay have one of the following shapes:

(3)

a) C V	rō	body	dò	head
b) C V V	tàā	take	òō	see
c) C V C	māñ	water	tél	return
d) C V C V	àndē	enter	kārī	fine
e) C V C V C	jálang	high	dàlùm	bean dish
f) C V C V C V	rátété	extremely (hot)	jùkètè	old, worn out

It is worth noting how strict the syllabic constraints are: there are no real exceptions in native morphemes (although I will look at one apparent exception below), and even loan words are usually forced to fit these patterns (e.g. French 'chaise' becomes séjè 'chair').

2.2 Harmonic constraints on morphemes

At an underlying level, the vowels which can co-occur within a morpheme are also highly constrained: in fact, there are only three basic patterns:

1> Harmonic Pattern 1: identical vowels.

The majority of morphemes fall into this category, although relatively few reveal this pattern at the phonetic level. In fact, it only shows up in two cases: either in morphemes of the shape [C] V C V where the second consonant is a sonorant, or in those of the shape [C] V C V C where the final consonant is /ng/ ([ḡ]):

(4)

dà yà	grasshopper	kò rō	donkey
ngólō	blister bug	kè rē	partridge
dú rú	hornbill	mbí ndí ng	very (heavy)

If the second consonant is an obstruent, the second vowel is neutralized to a schwa:

(5)

a) bā njē	leprosy	bà tē	sheep
b) è dè	fall (liquid)	késē	cough
c) gǒ jè	be short	ò gē	refuse
d) dǒ b'é	road	gò jè	knee
e) kú j'é	house	kū bē	cloth
f) tī tē	like	bísé	dog

More often than not, if the second consonant is a sonorant, the second vowel is dropped:

(6)

a) à r̄	be clear	nā n	maternal uncle
b) è m	be greasy	ndē n	be full
c) ò y	to gather	kò w	placenta
d) ò ng	be strong	kò y	death
e) ù n	to take	ù r̄	to sew
f) ì l	be black	kī r	firewood

Thus, I would argue that the morphemes in (6) have undergone the following historical change:

(C) V SonC V ---> (C) V SonV ə ---> (C) V SonC

If the original syllable had 3 syllables, both the second and third vowels are neutralized when adjacent to obstruents:

(7)

a) rātété	extremely (hot)	mákéké	for a long time
b) rètètè	carefully (look)	mégégé	extremely (short)
c) wókésé	hollow thing	gógégé	extremely (hot)
d) ròtètè	loudly (crackle)	lòkètè	extremely (muddy)
e) púkété	extremely (muddy)	mùgègè	alot (increase)
f) līkētē	behave foolishly	rítété	completely (cold)

If the second underlying consonant is a sonorant consonant, and the third an obstruent, the second neutralized vowel is normally dropped:

(8)

hùytè	misshaped and (long)	gūmsē	bean sauce
nìmsè	heavily (walk)	dórké	to the brim (full)

This explains the one apparent exception to rules governing syllabic shape of native morphemes noted above.

In patterns (C) V C V C, if both the second and third consonants are sonorant, the second vowel is neutralized:

(9)

a)	kāngèl̄	stick leash	ngàngèr	extremely (thin)
b)	kérém	lightly (touch)	pérér	completely (red)
c)	lórér	hard (knock down)	rórér	hard (pull)
d)	kōwēr	ball (of food)	sókér	very (angry)
e)	bùmèr	dust	yúrér	bright (red)
f)	sìkèr	chest (of dog)	bínén	extremely (sweet)

In many cases, phonetic realization of the neutralized vowel is dependent upon adjacent consonants. When /m/ follows, /u/ [U] is can occur instead of the schwa (e.g. [būlūm=būlēm] 'ostrich').

As noted above, if the final consonant is /ng/ the second vowel is not neutralized:³

(10)

a)	jáláng	quickly	bàndàng	type of net
b)	mbéléng	orderly	péléng	a lot (enjoy)
c)	njóróng	perfectly (even)	ngòròng	sickle
d)	hóróng	floats (net)	ndólóng	perfectly (smooth)
e)	yúdùng	quickly (enter)	yúrùng	barely missing
f)	bílìng	very (fast)	mbíndíng	very (heavy)

When the second vowel is not neutralized, the first is at times neutralized instead. This seems to occur most often when the vowel is /i/.

2> Harmonic Pattern 2: /{ u, i } ...a/

A second underlying sequence found in Mbay consists of an initial high vowel followed by /a/. Again, this sequence is not found extensively at the phonetic level, and is limited to cases where the second consonant is /w/, /y/, or /ng/:

(11)

a)	wìyà	type of fish	ndīyā	to walk
b)	tíngā	hot	ndīngā	to covet
c)	tūwā	to chase	njúwā	to bother

With other adjacent consonants, the vowel in the first syllable is neutralized, although its quality depends upon the nature of the adjacent consonants:

(12)

a)	[t̄-jā]	to cut up	[k̄-njá]	chicken
b)	[ȳ-dā]	type of tree	[ȳ-ná]	type of grass
c)	[k̄mā]	sorcerer	[m̄lā]	wildcat
d)	[t̄égá]	outside	[b̄égá]	old
e)	[k̄érā]	one	[k̄èlà]	work

The exact phonetic nature of the vowel in the first syllable is not important, just as the nature of the vowel of the second syllable is not important with morphemes containing identical underlying vowels. From the native speaker's perception what matters is only that morpheme belongs to a specific pattern. For example, b̄ētīng 'brain disease' might be pronounced b̄-tīng or even b̄ītēng with no conceivable change in meaning.

In words of three syllable, the patterns remains the same, except that the third vowel is also neutralized:

(13)

a)	m̄éráké	out of sight	s̄éwáté	in one gulp
b)	b̄èràng	galago	b̄éráy	completely (cut through)

If the last consonant is a sonorant consonant (13b), the neutralized vowel is normally dropped.

3> Harmonic Pattern 3: /i ... e/ and /u ... o/

The third and final underlying pattern, found in a relatively small minority of morphemes, is one in which the first syllable contains a high vowel and the second a corresponding mid vowel:

(14)

r̄úwō	beehive	ȳūrō	dirt
h̄ílē	blister	h̄ílē	perform rites
mb̄úrō=mb̄írē	to milk	nd̄ùlō=nd̄ìlē	to become thin

In this case, the first vowel can be neutralized, but this happens much less than with the other sequences. When it does, it retains much of its original height. With the pattern /u...o/, the first vowel will appear as a short [u], an [U], or an [ə]:

(15)

a)	t̄ùbò	lion	d̄ùndō	web (spider)
b)	nd̄ēgō	to buy	t̄égó=t̄úgó	to wash
c)	k̄ūrō=k̄ērō	to stir	mb̄érō=mb̄úrō	to milk
d)	b̄èlò	hole	t̄élò	type of dance
e)	nd̄īyō	to look for		

With the pattern /i...e/, it will show up phonetically either as [i] or [ɨ]:

(16)

- | | | | | |
|----|-------|--------|-------------|---------|
| a) | k-ndè | harp | ké-dìsé | sneeze |
| b) | kèrē | be red | mbírē=mbérē | to milk |

Note that /i...e/ and /u...o/ never contrast, and occasionally either pattern is possible for the same morpheme (e.g. mbúrō = mbírē 'to milk').

Finally, it should be noted that there are not many exceptions at the underlying level. In fact, many of the apparent exceptions noted in Keegan (1989) can be accounted for by assuming that they fit into the identical vowel pattern, but that the third consonant is the glide /y/:

(17)

- | | | | |
|------|-------------|---------|----------------|
| tótí | spread out | tórí | very (smooth) |
| lódí | very (soft) | wátí | missing target |
| kúrì | with force | ké-kùlī | millipede |

Thus, a form tótí will be derived as follows:

tótóy ----> tótéy ----> tótí

This explains the lack of forms (C) V C ə y at the phonetic level. Further, it correctly predicts that if a morphological process adds additional vowels, the original /y/ will reappear:

(18)

<u>ROOT</u>	<u>WORD</u>	<u>GLOSS</u>
wàlì	wàlèyāaa	dignified (walk)
ngùngì	ngùngèyùuu	protruding
dùrì	dùrìyùuu	be big and round

Again, it is worth noting how complete these three patterns are in describing vowel co-occurrence restrictions in Mbay. There are almost no exceptions to the patterns except for loan words.

3. Vowel Patterns in the Sara Languages

We will now turn to an examination of the extent to which these three harmonic patterns occur in other Sara languages. For convenience, I will divide the Sara languages into two groupings: an Eastern grouping, languages most closely related to Mbay; and a Western grouping (and here my data is more limited), together with Sara Kaba.

3.1 The Eastern Languages

The three patterns which emerged as useful in describing Mbay phonology are also clearly important for an understanding of the vowel systems in the Eastern languages (Sara, Daba, Gulay, Ngam, and Nar).

1> Harmonic Pattern 1: Identical Vowels. The view that Mbay morphemes which contain a schwa following an obstruent as the second vowel are actually derived from a form containing two identical vowels is given some support from data in Eastern dialects:

(19)

<u>Mbay</u>	<u>Sar</u>	<u>Daba</u>	<u>Gulay</u>	<u>Ngam</u>	<u>Nar</u>	<u>English</u>
ɔ̀dè		ɔ̀dɔ̀	ɔ̀dè			touch
màdè	màdè	màdà				baboon
kūbē	kūbē	kūbū				cloth/cotton
ndābé	ndābé		ndābé		ndābá	duck
bàtē		bàtā	bàtē		bàtē	sheep
yégē		yégē	yégē			rat

While Sar, Ngam and Gulay follow Mbay in neutralizing the second vowel, Daba and sometimes Nar retain the quality of the second vowel. In the case of Daba, it should be noted that the notation does not indicate the fact that this second vowel is pronounced somewhat weaker than the first. In the case of Nar, it appears to me that the second vowel is neutralized more often than not (e.g. bāgē 'shoulder', dòsè 'fill', ngónjē 'hernia'). Nonetheless Fournier (1973b:13) notes that "...les mots en /e - e/, /o - o/, et /a - a/ sont tres nombreux." Concerning Ngam, while I did not find the cognates for the examples in (19), Ngam follows the Mbay/Sar pattern of neutralizing the second vowel (e.g. ndògē 'grass fencing', ngɔ̀dē 'run', etc.).

When the intervening consonant is a sonorant consonant, the results are similar:

(20)

<u>Mbay</u>	<u>Sara</u>	<u>Daba</u>	<u>Gulay</u>	<u>Nar</u>	<u>Ngam</u>	<u>English</u>
wōng		hōngō	wōng	bōngē		anger
māng		māngā	māng			cow
ùn		ùn	ùn		wùn	take
àl	àl		àl	àlà		swim
wúl		húlū	wúl			groundnut

Again, Sar, Ngam and Gulay are similar to Mbay in that the neutralized second vowel is dropped after a sonorant consonant. In Gulay, if the first vowel is underlying /e/ it is usually pronounced /ə/ (e.g. yégē 'rat', tél 'return', nél 'wind', kèdē 'elephant').

In Daba, the second vowel is usually not dropped, and it retains its quality. Note, however, that in no language are we able to predict if the second identical vowel will be dropped when following a sonorant consonant. My impression from Mbay is that the vowel tends to be dropped with core vocabulary, and this seems to be true to a degree in Daba: Mbay /kón/ = Daba /kón/ 'nose', but Mbay /kōn/ = Daba /kōnō/ 'thorn'. However, Mbay tends to lose the second vowel more than most languages, while Daba seems to preserve it more.

In Nar, results vary: in a fair number of words the quality of the second vowel is retained (e.g. dāmā 'get by', njàrà 'cut', bārā 'anteater'). Fournier(1973b:5) also notes that words containing /ng/ as the second consonant normally pronounced as a single syllable, but then he remarks that in Sara both pronunciations are possible:

(21)

<u>Mbay</u>	<u>Sar</u>	<u>English</u>
máng	máng/mángē	tobacco
bìng	bìng/bìngē	thigh

There is also some evidence from Ngam and Gulay to indicate that Mbay/ Sar mono-syllabic morphemes containing a long vowel are also derived historically from a bi-syllabic root:⁴

(22)

<u>Mbay</u>	<u>Ngam</u>	<u>Gulay</u>	<u>English</u>
dāa	dāhā		do
kàa	kàhà	kàkà	grandparent
tèē	tèhē		go out
tāa	tāhā		take
kōó	kōhó	kōké	away, out
ndàa	ndàhà	ndàa	white

Evidence from Ngam suggests that Mbay/Sar words of this shape also belong to Harmonic Pattern 1. In Gulay, the long vowels are usually retained (e.g. jóo 'pot', kōo 'cry', bīi 'sleep'), but the cases with intervocalic /k/ are interesting, and we will see more of this in more distantly related languages.

2> Harmonic Pattern 2: the Mbay pattern of a high vowel or neutralized vowel in the first syllable and an /a/ in the second is maintained throughout the Eastern languages:

(23)

<u>Mbay</u>	<u>Sar</u>	<u>Daba</u>	<u>Gulay</u>	<u>English</u>
yēwā	wīyā	hīyō	wūyē	porcupine
nìngà		nìngà	nìngè	spear
mèlà		mùlà	mùlè	wildcat
síndá	séndá	súndá	síndē	horse
yīdā	yēdā	hīdō	yīdē	tree sp.
bìtà	bètà	bìtò	bìtè	tree sp.

In Sar, the pattern is identical to that found in Mbay. Although I did not find the cognates for the above examples for Ngam, the pattern is also maintained for the most part here (e.g. kēnjá 'chicken', nèngà 'spear'), although I did find one case (kēngō 'bone') where the pattern is ə...ɔ. In Gulay, the first vowel remains /i/ or /u/, while the second is neutralized to /ə/. In Daba, three patterns are possible: /i...a/, /u...a/, or /i...ɔ/.

In Nar, Fournier (1973b) and (1973c) indicates clearly that he considers morphemes of this type to form a pattern. Fournier(1973b:9) claims that Nar has at the phonological level a vowel, which he transcribes using /ø/, and which I will transcribe for convenience using /ɨ/. Fournier states that this vowel "...represente un archiphonème en une position ou toutes les oppositions vocaliques sont neutralisées. Il est toujours réalisée [œ] ou [ɤ]." He then notes (p. 13) that Sar patterns /ə...a/ appear in Nar with the /a/ replaced by this vowel, and he gives numerous examples (e.g. Sar /bèlà/ = Nar /bèlɨ/ 'shelter', Sar /bènā/ = Nar /bènɨ/ 'millet bran'). Examining his data, it appears to me likely that the distribution of this vowel can be explained entirely in this context, and that it occurs nowhere else in the language.

Data from the other languages also indicate that many of the Mbay mono-syllabic morphemes containing a single short vowel are also derived historically from this pattern:

(24)

<u>Mbay</u>	<u>Sar</u>	<u>Daba</u>	<u>Gulay</u>	<u>Ngam</u>	<u>Nar</u>	<u>English</u>
là	èlà	ùlà	ùlè	èlà	èlɨ	send
ndà	èndà	ùndà		èndà	èndɨ	hit
ndā	èndā	ūndā				set, put
ngà			ìngè	èngè	èngɨ	find
jà		ìjà	ùjè	èjà		cut

The data in (24) suggests that the Mbay data has been derived as follows:

{i, u} C a ---> ə C a ---> C a

The vowels found in the other Eastern languages fits perfectly into the description given above for this harmonic pattern.

A final remark is worth making concerning the Gulay data: note that in cases where the second consonant is an obstruent, the resulting morpheme will at times fail to contrast with a morpheme from Harmonic Pattern 1:

ùsù ---> ùsè grind, crush
 ùsà ---> ùsè eat

3> Harmonic Vowel 3: the Mbay harmonic pattern consisting of a high vowel in the first syllable followed by a corresponding mid vowel in the second syllable also maintains itself among these languages. Looking first at the data for the more common /u...o/ form of this pattern, we find:

(25)

<u>Mbay</u>	<u>Sara</u>	<u>Daba</u>	<u>Gulay</u>	<u>Ngam</u>	<u>Nar</u>	<u>English</u>
tūrō	tērō	tīrō			tōrō	weed sp.
tégó			tógó	tégō	tógō	wash
ndēgō			ndōgō			buy
lùbò	lùbò/lòbè	lòbò			lòbò	stork sp.
mùnjò	mènjò	mònjò	mùnjù	mènjò		beans
bèlò			bèē	bèlò		hole

Sar and Ngam both appear to follow Mbay closely, except that the initial vowel is usually neutralized. In one Sar case, we see that the pattern /u...o/ has an alternant /o...ə/. In Daba, the pattern appears as either /o...o/ or /i...o/, while in Gulay it is /o...o/ or /u...u/. And in Nar, Fournier(1973b:13) notes that the Sar pattern /ə...o/ show up in Nar as /o...o/, and this is what we see in (25).

It would appear from the transcription that in some cases, such as Daba where the Mbay pattern /u...o/ appears as /o...o/, the derived pattern from Harmonic Pattern 2 merges with that of Harmonic Pattern 1, identical vowels. However, in the Daba case at least, I do not believe this is the case: my impression is that the second vowel in morphemes derived from /o...o/ (identical vowels) are weakened, although they maintain their original quality. Similar examples should exist in Nar, although I have not found any that contrast in this way.

Most of the Mbay mono-syllabic morphemes containing a short vowel /o/ clearly fall into this pattern as well:

(26)

<u>Mbay</u>	<u>Sar</u>	<u>Daba</u>	<u>Gulay</u>	<u>Ngam</u>	<u>Nar</u>	<u>English</u>
tō	ètō/ìtō	ìtō	òdō	ètō	òtō	carry
gō	ègō/ìgō	ìkō	ùgō			laugh
sō	èsō/ìsō	ìsō	ùsō	èsō	òsō	fall
jō	èjō/ìjō	ìjō			òjō	weave

These cases, together with those discussed in Harmonic Pattern 2, do much to explain why Mbay is unique among the Sara languages in maintaining a systematic phonological distinction based on vowel length.

As is true in Mbay, the pattern /i...e/ does not contrast with /u...o/ in any of the Eastern languages, although this form of the pattern is much less common:

(27)

<u>Mbay</u>	<u>Sar</u>	<u>Daba</u>	<u>Gulay</u>	<u>Ngam</u>	<u>Nar</u>	<u>English</u>
	èrè				èrè	support
ndìjè	dèjè/dìjè		dèjè		dèjè	ask
kélē	kélē		kél		kélē	bird sp.
tùtō	tùtō				tètē	sweat

The clearest correspondence here is from Nar, where the Mbay /i...e/ pattern shows up as /e...e/, similar to the way the pattern /u...o/ shows up as /o...o/. In Gulay, the second vowel becomes schwa, just as it did when derived from the /u...o/ form of the pattern. In Sar, the final vowel is /e/, like Mbay, but the quality of the first value appears to change significantly. Note that a /u...o/ form of the pattern in one language might well show up as a /e...i/ form in another language (e.g. Mbay tùtō 'sweat' vs. Nar tètē).

We can summarize our findings within the Eastern Sara languages as follows: first, it is clear that these three harmonic patterns play an important role in limiting the co-occurrence of vowels within morphemes throughout these languages, accounting for a majority of their morphemes. There are very few cases where a word in one pattern in one language appears as a word from another pattern in another (some exceptions are Sar lòbè 'stork' or Daba yítā 'flatter'). Second, when neutralization of a vowel takes place, the shape of the neutralized vowel is not very important. It might become a schwa (as is standard in Ngam or Sar), or any vowel except for /a/. The important fact is not the quality of the vowel, but rather the harmonic pattern to which it belongs. Thirdly, in at least the case of Gulay, it is not even necessary that the same vowel undergo neutralization: thus, in Gulay morphemes of Harmonic Pattern 2, it is the second vowel which is neutralized, whereas it is the first vowel in all the other languages.

3.2 The Western Sara Languages and Sara Kaba.

Data for the Western Languages is far more limited: I have excellent sources for Ngambay in Negor and Mekongoto (1978), and for Bediondo in Adami et al (1981). But I have very little for Mbay Doba, and none for Kaba, Laka, Murum, Gor or Mberi. I will limit myself here to Ngambay and Bediondo. For convenience, I will also examine data from Sara Kaba in this section.⁵

In general, the three harmonic patterns maintain themselves fairly well in the Western dialects, although some important subdivisions begin to occur. In Sara Kaba the three patterns are

also important, but they are by no means sufficient to account for the vast majority of morphemes.

1> Harmonic Pattern 1: The identical vowel pattern is clearly an important one in Western dialects, and exists as well in Sara Kaba. When the intervening consonant is an obstruent, the second is neutralized in Bediondo, sometimes in Ngambay, but never in Sara Kaba:

(28)

<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
mèdè	mɛ̀dè	mèr		beads
àtē	àtē	àdē		bitter
ndògē	ndògē	ndògō	njòbō	grass fence
àjè	àjè	àjì	àyà	cure
nújé		nùjè	ndújù	destroy
bísé	bésē	bísī	bísì	dog
àsè	àsè	àsè	àsà	be enough
ìbè	èbè		ìbì	fan
ùgè	ùgè	ùgù	ùgù	scratch
òjè	òjè	ùjì, òjì	òyò	give birth
òjè		òjì	òjò	measure

In Bediondo, when the first vowel is /e/ in this pattern, it appears as /ɛ̀/; when the first vowel is /i/, it appears as /ə/. In (28), examples of the pattern /o...o/ appear as /o...ə/, but we will note below that this is not always the case. In Ngambay, the second vowel is sometimes neutralized and sometimes not: I have not yet found a phonological explanation for this. If the intervening consonant is /j/, the second consonant will be /i/. In Ngambay, the pattern /o...o/ often occurs as an alterant to /u...u/: e.g. (rōgō = rŭgū 'roll', nùjī = nòjī 'relative'). In Sara Kaba, the second vowel is never neutralized: in fact, the vowel /ə/ does not occur in the language.

When the intervening consonant is a sonorant consonant, the results are similar:

(29)

<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
òy	òy	ùy/òy	ò	die
tàm	tàm	tèmè	tèmbè	dew
mā́í	mā́í	mā́í	mā́lá	sorcery
ùl̄		ùl̄	ùlū	raise
ndīr	ndēr		ndīrī	cook/boil
kúl	kúl	kúlū	kúlù	charcoal
ìl	èl	ìl		suck
ùn	ùn	ùn	ùnù	take
òy		òy	òkò	gather

Bediondo and Ngambay tend to drop the second vowel in morphemes of this pattern, while Sara Kaba tends to retain it.

The Sara Kaba data also provides additional information regarding the source of long vowels in the Sara languages:

(30)

	<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
a)	tàā		tàā	tàkā	take
	tèē		tèē	tàkī	come out
	ndòō		ndòō	njàkā	cultivate
b)	sūu	sū	tū, sū	tūhū	smoke
	ndūu	ndū	ndūbū	ndūhū	explode
	tòo	tò	tò	tòhò	piroque
	kōo	kō		kōhō	seed
c)	ndòò	ndòn	ndò	ndòlò	tongue
	péē	pólē, pótē	péē	hólō	stir
	jī	jī	jī	jīlī	hand

In (30) we see that long vowels in Sara appear as bi-syllabic words with intervocalic /k/, /h/, /l/ or /b/ in Sara Kaba, suggesting that the intervocalic /h/ noted above in Ngam has more than a single source.

While it is clear from the above data that the identical vowel pattern is an important one in Bediondo and Ngambay, we begin to see in these languages some slight subdivision which does not exist in the Eastern dialects. Fournier (1973c:16) notes that the patterns /a...e/ and /o...e/ are fairly common in Bediondo, and they also occur in Ngambay:

(31)

<u>Mbay</u>	<u>Sar</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
kàrī	kàrī	kàrē	kàrī		simple, etc.
njàr	njàr	njàrè	njàrè		split
	nànā	nànē	nànī(?)		tell
àl	àl	àlè	àlè	àlè	swim
dōl	dōl	dólé			tree sp.

Data we have seen from the Eastern languages, especially Daba and Nar, would suggest that these roots were derived historically from roots with identical vowels (e.g. Nar njàrà 'split', àlà 'swim'). But in Bediondo, and rarely in Ngambay, they appear with /a...e/, a pattern not found in the Eastern Sara languages.

In Sara Kaba, the number of subdivisions of the morphemes of this pattern grows substantially:

(32)

	<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
a)	gèl bètē gēw yèl kèdē	ḅtē ḳdē	gèl, gèl bèdē yèl kèr	gàlì bàtī gábī àlī kàjī	left monkey freeload bird elephant
b)	tàl mātē àl gàjè sájé tāgē wàsē	mātē gàjè sájē wàsē	tàl mādē àl tāgē wàsē	tàlō mātō àlō gàjō sáyō tāgō wàsō	dew tree sp. climb horn brother-in-law genet pumpkin
c)	dīw, dūu njūū yíl	dēbē njébbē yéll	 njíbī íl	dókù njóbū wólū	dark suck mosquito
d)	ùtē ùnjē ìl wúl gūm	ùnjē ìl wúl	ùnjī ìl ḅl-ùbū	òtī ònjī òlì wólī gōmbī	close be bright suck ground nut trap
e)	dōl hòr mòtè mósé	(wāy) ṃtè móesē	dēl pèr mésē	dālú hàrù mòtù màsù	fish sp. fire sickness blood
f)	tōl òr tōn bōl bōn ndòm	 tōn bōl ndàm	tōl tōn bōl bōn	tōlē òrē tōnē bālē bōnē njòmē	kill remove lick tree sp. squirrel sp. squirrel sp.
g)	mbēté kānjē	mbāté kānjē	mbādé kānjī	mbāté kānjē	refuse fish
h)	kón kún	(əm) kún	(əm) (bār)	kúnū kúnā	nose name (v.)

In (32a), we see that some Sara /e...e/ morphemes have a corresponding /a...i/ in Sara Kaba. In (32b), many of the pattern /a...a/ shows up as /a...o/ in Sara Kaba. In (32c) and (32d), we see that the Sara patterns /i...i/ and /u...u/ can have reflexes of /o...i/ or /o...u/. In (32e), we find that Sara /o...o/ can have reflexes have /a...u/ in Sara Kaba. In (32f), we find that the Sara pattern /ɔ...ɔ/ appears at times as /ɔ...e/ (or /a...e/) in Sara Kaba. The examples in (32g) fall into the pattern shown in (31), where we saw that /a...a/ shows up as /a...e/ in Bediondo. And the examples in (32h) suggest additional patterns not yet uncovered.

The Sara Kaba examples in (32e) appear to provide an explanation for the fact that the Eastern Sara pattern /o...o/ can

appear both as /o...ə/ and /ɛ̃...ə/ in Bediondo: the former are correspond to /o...o/ in Sara Kaba, while the latter correspond to /a...u/.

Forms of the /a...o/ pattern in Sara Kaba help account for a few more mono-syllabic morphemes in the Sara languages:

(33)

<u>Mbay</u>	<u>Ngam</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
kòō	kòhò		kàw	breathing
lóō		ló	náw	yawn

The derivation of the forms would be as follows:

* kàhō	---	kàwū	----	kàw	(Sara Kaba)
* kàhō	---	kòhō	----	kòō	(Mbay/Sar)

While the Sara Kaba examples above include no cases where the second vowel has been dropped, there are a fair number of cases where this situation does occur:

(34)

<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
tóm	tém	tém	tóm	parasitic plant
háy	káy	áy	háy	paddle

2> Harmonic Sequence 2: The second sequence maintains itself very well in the Western Languages and in Sara Kaba:

(35)

	<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
a)	bíyā		bíyā	bíyā	porridge
	nìngà	nèngɛ̃		nìngà	spear
	kīnjá	kēnjóe	kūnjá	kūnjá	chicken
b)	jà	èjɛ̃	ùnjà	ìyàa	cut
	ndà	èndɛ̃	ùndà	ìndà	hit
	ḃā	èbū	ùbā	ùbā	crowd (v.)
	là	èlɛ̃	ùlà	ìlà	send

In Ngambay and Sara Kaba, these patterns are maintained perfectly, the only difference being the quality of the less important first vowel. In Bediondo, the first vowel appears as schwa, and the second as either /ɛ̃/, /ū/, or /óe/. Fournier (1973c) suggests that the distribution of this vowel is predictable. From the above data we can conclude that it can occur either as the second vowel in this second harmonic pattern, or as the first when the underlying pattern /e...e/ or the /a...u/ subset of /o...o/.

3> Harmonic Pattern 3: In Sara Kaba and Ngambay, we find the Mbay/Sara pattern of a neutralized vowel followed by a mid vowel (/o/ or /e/) is clearly maintained. In Bediondo, on the other hand, it splits again into two sub-patterns:

(36)

	<u>Mbay</u>	<u>Bediondo</u>	<u>Ngambay</u>	<u>Sara Kaba</u>	<u>English</u>
a>	bèlò	bòlè	bòlò, bèle	bìlò	hole
	mbúrò	mbóre	mbórò		milk
	rúwò/réḃò	róbè			beehive
	dūlò	dōlè			wrap
	bùtò	bòtè	bòdò		millet water
	tūro	tōnè		tīyò	weed sp.
b>	mùnjò	mènjè	mìnjì	mìnjò	beans
	túgò	tógè	tógò		wash
	tò	òtè	òdò	ìtò	carry
	sò	òsè	òsò	ìsò	fall

All cases for which I found reflexes appear as /i...o/ in Sara Kaba, while all but one appear as /o...o/ in Ngambay. In Bediondo, on the other hand, both /o...ə/ and /o...e/ occur, and in this case we cannot look to Sara Kaba data for an explanation for this split.

I have very little data for the rarer pattern /i...e/, and will attempt to make no generalizations concerning it for Western Sara or Sara Kaba at this point.

3.3 Summary on Vowel System in Sara:

From the evidence presented above, it is clear that the three harmonic patterns found in Mbay play an important role throughout the Sara languages. They completely dominate in Eastern Sara languages, where very few native morphemes occur outside of the range of harmonic patterns they permit. In the Western dialects of Bediondo and Ngambay, they are also extremely important, although we have seen that several additional patterns begin to appear. Further, using these patterns we are able to limit the historic vowel system for Sara to those vowels in (2), and to provide a systematic explanation for the numerous neutralized vowels that occur in the various Eastern and Western Sara languages. The three harmonic patterns fall short, however, in Sara Kaba: while patterns 2 and 3 maintain themselves clearly, pattern 1 is substantially subdivided,

resulting in harmonic system which is much less restricted than that which is found in the Sara languages.

4. Sources for the Sara Harmonic Patterns:

In this section, I will expand the scope of the investigation slightly to include four related languages from outside of the Sara family: Kenga, Yulu, Bagirmi and Fer. My goal is to attempt to uncover the beginnings of an explanation for how the harmonic patterns in Sara.

4.1 Vowel Length

Data from Kenga provides important clues as to how these patterns might have emerged. In the bi-syllabic roots of this language, the first vowel can be either long or short, resulting in a phonological distinction between morphemes of the shape [CVVCV] and [CVCV]. Kenga data from Vandame(1968:6) illustrates this:⁶

(37)

k-òḡō	pay	k-òòḡō	forbid
dàb̄ā	man	dàabà	drying structure
àr̄ā	here	àarā	jar

Examining the data from Kenga, it quickly becomes clear that the forms containing initial long vowels appear in Sara languages in the Harmonic Pattern 1:

(38)

	<u>Mbay</u>	<u>Kenga</u>	<u>Yulu</u>	<u>Fer</u>	<u>Bagirmi</u>	<u>English</u>
a)	kūb̄ē	kūub̄ē				cloth/cotton
	kūl	kūulū				cold
	èd̄è	èed̄ē			ɛd̄(e)	rain (v.)
	màs̄ē		màas	màs		tree sp.
	mbòr		mbɛɛr			fruit tree
	ngāng	nāangā				teeth
	dàw	dàabà				drying structure
b)	òḡē	òòḡō				prohibit
	òj̄ē	òòj̄ō				show/say
	òs̄è	òòs̄ō	ìis̄ī	òs	os(o)	pierce

There is substantial data from Kenga exhibiting this correspondence.⁷ A few cases from Yulu also appears to support this view, but we will see further on that Yulu does not serve us very well in this regard. We would expect then that the morphemes in Kenga and Yulu which contain short vowels within the first syllable, as well as in Yulu, to show up as Harmonic Pattern 2 or 3 in the Sara languages, and further that where Patterns 2 and 3 occur, short vowels will be found in the first syllable in reflexes in Kenga and Yulu:

(39)

	<u>Mbay/Sar</u>	<u>Kenga</u>	<u>Yulu</u>	<u>Fer</u>	<u>Bagirmi</u>	<u>English</u>
a)	síndá	síndì			sUnda	horse
	mèlà	mòlò				wildcat
	tèsá	tàsè				bran
	yèwà	iàoa				porcupine
b)	mùnjò	mònjò				beans
	ndēgō	dūgū	ndōogō			buy/trade
	bèlò	bòlò				hole
	bùlò	bùlù				slave
c)	gā/ègā	ògō				pay
	jà/èjà	òjō		ìnjá		cut
	sà/èsà	òsō	òosō	ùsà	sà	eat
	yā/ìyā	òjō				hide
	nda/èndà	òndō				hit

In (39), we find that the Kenga data supports this view quite well. It further appears that the distinction between patterns 2 and 3 in Sara is based on the quality of the vowels in the morphemes from which they are derived. Thus, Sara forms such as síndá 'horse' and bísé 'dog' both appear to be derived historically from a morpheme of the shape /i...i/; the key factor in explaining their difference is the length of the first vowel:

sindi	---	sənda
biisi	---	bisə

While the number of Yulu cognates found is limited, it does not provide any evidence for this, since all three of the harmonic patterns in Sara have corresponding forms in Yulu with a long vowel in the first syllable.

4.2 Consonant Clusters.

We have seen that the Sara languages do not permit any consonant clusters within a morpheme (with the exception of the pre-nasalized stops). Kenga and Bagirmi are slightly less constrained in this regard, in that in a bi-syllabic word, if the first syllable ends in a sonorant consonant, the second syllable can begin with a consonant:

(40)

<u>Kenga</u>	<u>Bagirmi</u>	<u>English</u>
dūrnū		lower back
	bərnɪ	rhinoceros
bürtù		porridge
ddrlà		idiot

When these morphemes appear in Sara languages, they again appear within the Harmonic Pattern 1:

(41)

Mbay/Sara	Kenga	Bagirmi	English
bàn/bèn		bɛrni	rhinoceros
dūn	dūrnū		lower back
kòsé	kòrsò		cucumber
yégē	órgè		mouse
---/kíl	círlì		lizard sp.
kāsē		karca	shin
māl		marlo	vulture
kádé	kárdà		stalk

When this occurs, the first consonant is usually dropped and the second is retained.⁸ Thus, we might derive Mbay dūn 'lower back' to be derived as follows:

dūrnū --> dūunū --> dūnū --> dūnē --> dūn

4.3 Long Vowels in Sara.

Kenga and Bagirmi also provide some additional evidence concerning the origin of Sara mono-syllabic morphemes containing a long vowel. An examination of Kenga data reveals that Kenga has even less mono-syllabic morphemes than Sara Kaba -- in fact, with the exception of a handful of

grammatical formatives, they do not appear to occur at all. As a result, a fair amount of information can be gleaned regarding the origin of Sara long vowels:

(42)

<u>Mbay</u>	<u>Ngam</u>	<u>S.Kaba/Dem</u>	<u>Kenga</u>	<u>Bagirmi</u>	<u>English</u>
tèē	tèhē	tàkī		tɛk(ɛ)	come out
kàa	kàhà			kaka	grandparent
tìī		tìkī	tìikì		intestines
tàā	tàhā	tàkā	tòkō		take
káā	káhā	---/káh	gàákà		crow
òō	wòō		áakà	ak(a)	see
búu	bū		būrkū		ashes/dust
sáā	sā		sákà		look for

It appears from this evidence that intervocalic /k/ in Kenga and Bagirmi became weakened to /h/ and eventually disappeared in all but a few of the Sara languages. Note that in these cases the length of the vowel in the first syllable in Kenga is not important, as the result is the same. The data also suggests that the loss of consonant clusters preceded the loss of the /k/:

būrkū --> būukū --> būukū --> būuhū --> būhū --> būu

Less common are correspondences between Sara long vowels and intervocalic /p/, as noted by Thayer(1974), or intervocalic /y/:

(43)

	<u>Mbay</u>	<u>Kenga</u>	<u>Bagirmi</u>	<u>Yulu</u>	<u>Fer</u>	<u>English</u>
a)	dèē ndàa nāā		deb(e) njàp(e) nap(o)		līf	person moon
b)	kìyà ndóō gèè	dóoiò jèeā	ndoyo gey(o)	sàap	kùyà	knife read,write want

The cases in (43b) with /y/ contrast with many other cases where intervocalic /y/ in Kenga and Bagirmi remains unchanged in Sara (e.g. Bagirmi /òy(o)/ = Mbay /òȳ/ 'be heavy').

Conclusion

The evidence from Kenga and Bagirmi suggests a reasonable explanation for the evolution of the Sara vowel system. The combined forces of an increasingly restrictive system of harmonic constraints and syllable structure resulted in the three patterns which constrain the morphemes found in the modern Sara languages.

NOTES

(This version contains some slight revisions. The most important involves the use of the "barred i" [ī] instead of [I]. Jim Roberts of SIL-Chad has convinced me that I have been in error using [I]. (JMK: July, 2009)

1. This does not include the neutralized vowels used by Pio et al in the Bediondo Lexicon: the work unfortunately does not include a description of their phonetic realization, nor does it include all the vowels used by Fournier in his description of Bediondo.

2. A more detailed examination of syllabic and harmonic constraints in Mbay is contained in Keegan(1995).

3. Note that the /ng/ is pronounced [ŋ] in this environment.

4. Fèdry notes in the introduction to Yangontan and Moymadide(1978) that the Tèl̄ dialect described in this work is less influenced by Sar and Mbay than other Ngam dialects, and mentions specifically the retention of bi-syllabic forms such as tèhē 'come out'. Fèdry also notes that the Tèl̄ dialect permits /d̄ē/ as an alternant to final /r/ (e.g. /bìr=bìd̄ē/ 'mortar').

5. The name Kaba is confusing in that there are two distinct languages with that name: Kaba is a Central Sara language spoken in the area around Gore, south of Moundou. Sara Kaba is a language group spoken in the area around Kyabe, east of Sarh. According to Gordon (2005), Sara Kaba includes 5 languages. The data used here is of the Na language/dialect and is taken from Danay et al (1986).

6. Vandame indicates vowel length by underlining the vowel; I have transcribed this here with two vowels.

7. There are also a few exceptions, such as 'fish' (kānjē in Sara, kènjè in Kenga), where I would expect to see the vowel long.

8. Kenga dārgà to Sara dèr 'shield' appears to be an exception to this.

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