

**Was there a now-vanished branch of  
Nilo-Saharan on the Dogon Plateau?  
Evidence from substrate vocabulary in Bangime and  
Dogon**

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**ABSTRACT**

The Nilo-Saharan languages are spread from Morocco to Central Tanzania, and are Africa's most widespread and internally diverse phylum. The fragmentary geography of Nilo-Saharan makes it more than likely that it was once more widespread in the areas that now lie between existing branches and that both individual languages and whole subfamilies have been assimilated. The paper proposes that a Nilo-Saharan substrate can be detected in Bangime, an isolate language spoken on the Dogon Plateau in Mali. A series of tables are presented showing Bangime cognates with other branches of Nilo-Saharan. There is also a small set of words which show similarities to Dogon rather than Bangime. It is suggested that there was an independent branch of Nilo-Saharan present on the Plateau which was assimilated following the expansion of Bangime and Dogon.

Keywords; Nilo-Saharan; Dogon; Bangime; lexical comparison; substrate language

**1. Introduction**

The Nilo-Saharan languages are spread from Morocco to Central Tanzania, and are Africa's most widespread and internally diverse phylum. Today, its various branches are scattered across Africa, separated from one another by blocs of later, intrusive languages, notably Niger-Congo and Afroasiatic. The fragmentary geography of Nilo-Saharan makes it more than likely that it was once more widespread in the areas that now lie between

existing branches and that both individual languages and whole subfamilies have been assimilated. The question then arises as to whether submerged Nilo-Saharan languages can be detected through the identification of substrates in languages spoken today, especially in Sahelian Africa. The Songhay cluster, spoken in Mali and Niger, is geographically and linguistically remote from its nearest relative, the Saharan languages, and the assumption must be that other Nilo-Saharan languages were once spoken across the terrain now within the boundaries of Niger and Nigeria. Drake, Blench et al. (2010) have argued that Nilo-Saharan expansion was driven by the abundance of aquatic resources in the Sahara at the beginning of the Holocene, i.e. some 11-10,000 years ago. At this period, mobile hunter-gatherers may have formed niche populations in many areas. With the development of agriculture and associated demographic shifts, many such foraging groups may have been absorbed by their more numerous neighbours.

One intriguing example illustrating this is an apparent Nilo-Saharan substrate in languages of the Dogon-speaking area of Mali. The Bandiagara Plateau is an arid rocky Plateau east of the Inland Niger Delta. Its main inhabitants are the Dogon peoples, a cluster of twenty or more related languages generally considered to be related to Niger-Congo (Hochstetler et al. 2004; Dogon and Bangime linguistics website<sup>1</sup>). Map 1 shows a rather preliminary map of Dogon lects, based on Hochstetler et al. (2004), while more detailed maps of individual lects can be found at the Dogon languages website.

Among the Dogon live the Bangime, who speak a language which is not Dogon and which appears to be an isolate (Blench 2007, in press). Extended work on the Bangime language (Hantgan 2012, 2013) points even more strongly to its distinctiveness. The Bangime are encircled by the Dogon and have adopted their culture to the extent that they consider themselves Dogon. However, they must represent one of the layers of population on the Plateau prior to the expansion of the Dogon. There is some evidence for this in the presence of lexemes that resemble Bangime in the Dogon languages immediately adjacent to it, suggesting that there were formerly other languages related to Bangime which were assimilated by the Dogon.

Most Dogon lects are spoken today on the southern fringe of the Songhay-speaking area, and place names of likely Songhay origin occur throughout the region. We can therefore expect to find some Songhay borrowings in Dogon, although these are surprisingly few. However, detailed analysis of the Bangime lexicon shows a series of striking resemblances to common Nilo-Saharan lexemes, including branches now geographically remote from Mali. This paper will argue that;

- a) there was once a branch of Nilo-Saharan, now submerged, spoken on the Bandiagara Plateau
- b) that this can be detected from residual lexicon in Bangime, some of which is also present in neighbouring Dogon languages
- c) that there are also Nilo-Saharan lexemes in Dogon which point in the same direction
- d) and that this substrate branch was an independent branch of Nilo-Saharan, showing no specific relationship to Songhay or other geographically close branches.

The evidence for this is primarily lexical. Bangime does not show any distinctive phonology and its noun morphology is very reduced. This does not exclude the possibility that more opaque similarities in grammar will be uncovered.

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<sup>1</sup> Downloadable pdfs of all project documents in Dogon and Bangime linguistics are available at <http://dogonlanguages.org>



1.	#-da	tree			
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>
Kuliak		So	ad	tree	HC
Koman		Opo	tʃa	tree	Be83a
Gumuz			ǰá	tree	Ah04
ES	Ama	Ama	túmà	tree, firewood	Ki96
ES	Daju	Shatt	è(e)t	tree	Bo08
Saharan		Sagato	dā	wood	Pe87
Bangime			d <sup>w</sup> àè	tree	Ha12

**Commentary:** Note, however the striking resemblance of Kuliak to Ethiopic ‘əḏ ‘tree;.

2.	#-kuC-	house			
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>
Koman		Opuo	kù	house	Si13
Gumuz			ǰú-	place	Ah04
Bertha			ǰúli	house	B-G07
Kunama		Kunama	ku.duma	house	Be01
Kuliak		Nyang’i	o, oik	house	He76
ES	Nilotic S	Nandi	kàà	house	CC01
Furan		Amdang	kuluk	<i>maison</i>	Wo10
Maban	Runga	Aiki	kùdù	<i>case</i>	No89
Mimi			kurule	<i>Haus</i>	LV39
CS	KA	Kresh	kóyò	<i>maison</i>	Bo00
CS	SBB	Yulu	ǰù	<i>maison</i>	Bo00
Saharan	East	Beria	ke, ko	place	JC10
Saharan	West	Teda	koy	place	LeC50
Songhay	South	Zarma	hú	<i>maison</i>	BW94
Bangime			ko	house	Ha12

3.	#-(k)olo(d)-	egg			
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>
Bertha		Mayu	húúhúli	egg	B-G07
Kunama		Kunama	kokipna	egg	Be01
Kuliak		So	kebc-at	egg	HC
ES	E Jebel	Gaam	kɔlɔd	egg	Ma04
Furan		Amdang	kɔrda	<i>oeuf</i>	Wo10
Maban		Aiki	kèdé	hen	No89
Saharan	East	Sagato	akora	egg	Pe87
Saharan	East	Beria	ǰónó	<i>oeuf</i>	JC04
Songhay	South	Zarma	ǰùǰùrí	<i>oeuf</i>	BW94
Bangime			kú	egg	Ha12

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4. nose					
Family	Subgroup	Language	Attestation	Gloss	Source
Shabo		Shabo	sonna	nose	Jo11
Koman		Gwama	ʃó(n)ʃ	nose	KR12
Koman		Tw'ampa	ʃim	odour, smell	DK
ES	Nubian	Meidob	èsèŋi	nose	We93
ES	Nubian	Nobiin	soriŋ	nose	We87
Furan		Amdang	siŋ	<i>sentir odorat</i>	Wo10
Maban	Runga	Aiki	simbo	<i>éternuer</i>	No89
CS	SBB	Baka	sòmò	<i>nez</i>	Bo00
CS	SBB	Gula	sòm	<i>nez</i>	Bo00
CS	SBB	Fer	sùm	<i>nez</i>	Bo87
CS	SBB	Kenga	òòmò	<i>nez</i>	Pa04
Saharan	East	Sagato	sāno	nose	Pe87
Saharan	East	Beria	sínā	<i>nez</i>	JC04
Bangime			sũmbírí	nose	Ha12

5. tooth					
Family	Subgroup	Language	Attestation	Gloss	Source
Koman		PK	*ʃeʔ	tooth	Be83
Gumuz		Guba	k <sup>w</sup> osa	tooth	Ah04
Maban	Runga	Aiki	sàdí	<i>dent</i>	No89
CS	MM	PMM	*sí	tooth	WB99
CS	ME	Lese	úsé	<i>dent</i>	DD
CS	KA	Kresh	sèsè	<i>dent</i>	Bo00
CS	SBB	Bongo	usu	<i>dent</i>	Bo00
CS	SBB	Yulu	óosè	<i>dent</i>	Bo00
Saharan	West	Manga	tími	<i>dent</i>	Ja
Bangime			nóó ñó siìn	tooth	Ha12

6. star					
Family	Subgroup	Language	Attestation	Gloss	Source
Kuliak		Ik	dǒlɛát	star	He99
ES	E Jebel	Gaam	turi	moon	Ma04
ES	Temein	Temein	dúliṭ	??	RCS
ES	Ama	Afitti	midí	star	Be00
Furan		Fur	dóàl	moon	Wa10
Maban		Maba	bodur	<i>pleine lune</i>	Da03
CS	LN	Lendu	dyodyo	star	RCS
CS	MA	Mangbetu	né-túlú /é-	<i>étoile</i>	De92
CS	FS	Formona	ntudyu	star	Ha78
Saharan		Teda	uri	<i>lune</i>	LeC50
Bangime			tòrémé	star	Ha12

7. #-(b)uru(t)- cloud					
Group	Subgroup	Language	Attestation	Gloss	Source
ES	Nilotic W	Shilluk	polo	cloud	He37
ES	Nilotic S	Nandi	póól	cloud	CC01
ES	Temein	Temein	kəbórtɛ̄t	cloud	RCS
Maban		Masalit	à-bíri	cloud	Ed91
CS	MM	Lugbara	bu	cloud	WB99
CS	FS	Sinyar	mborbu	cloud	Ha78
Saharan	East	Beria	búrdū	<i>nuage</i>	JC04
Songhay	South	Hombori	búró	cloud	He
Songhay	South	Zarma	búru	<i>nuage</i>	BW94
Bangime			póórò	cloud	Ha12

8. frog					
Family	Subgroup	Language	Attestation	Gloss	Source
Koman		Anej	gɔ	frog	Be83
Gumuz		Yaso	eeguda	frog	Ah04
ES		Nara	gòò	frog	Ha00
ES	Nilotic W	Luo	ɔgwal	frog	Ca98
ES	Nilotic E	Camus	n.kook	frog	Vo82
ES	Daju	Liguri	ɓogox	frog	Th81
ES	Ama	Ama	gwɔ	frog	Be00
Fur		Fur	gɔrɔŋ	frog	Wa10
Maba		Maba	aŋgalag	<i>grenouille,</i> <i>crapaud</i>	Da03
Saharan	East	Beria	górgá	<i>grenouille</i>	JC04
Saharan	East	Sagato	kaka	frog	Pe87
Saharan	West	Kanuri	kókó	frog	Cy94
Songhay	North	Tadaksahak	agúru	frog	He
Bangime			búgúruù	frog	Ha12

9. #dona bite (v.)					
Family	Subgroup	Language	Attestation	Gloss	Source
Koman		Opo	dɔŋ	to bite (snake)	Si13
Bertha		Mayu	θiŋa	to eat	B-G07
ES	Ama	Afitti	ŋwɔd-ɛ	to bite	Be00
ES	Taman	Ibiri	dam	to eat	Ed91b
Kadu		Tulishi	agí.dóónɔ	to bite	Sch94
Maban		Maba	ndziŋa	<i>croquer,</i> <i>mâcher</i>	Da03
CS	ME	Lese	tàhó	<i>mordre</i>	DD
CS		Sinyar	junna	to bite	Ha78
CS	SBB	Sara	dùùn	<i>mordre</i>	Bo00
CS	SBB	Ngambay	tó	<i>mordre</i>	Bo00
CS	SBB	Kenga	dóɔŋò	<i>mordre</i>	Pa04

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10.	#dona	bite (v.)			
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>
Bertha		Mayu	θiɲa	to eat	B-G07
ES		Dinik	ɲwɔd-ε	to bite	Be00
Kadu		Tulishi	agídóónɔ	to bite	Sch94
CS		Sara	dùùn	<i>mordre</i>	Bo00
CS		Ngambay	tó	<i>mordre</i>	Bo00
CS		Kenga	dòɔɲò	<i>mordre</i>	Pa04
CS		Lese	tàhó	<i>mordre</i>	DD
Bangime			táɲwá	to bite	Ha12

11.	#nya(N)-	to give			
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>
ES		Nara	nin	give	RCS
ES	Surmic	Didinga	ɲa	give	RCS
ES	Nilotic S	Nandi	nakà	give liquid to	CC01
Kadu		Talasa	ná	give	Sch94
Maban		Maba	ɲu	<i>donner</i>	Da03
Fur		Fur	aní	give!	RCS
CS	MA	Mangbetu	nòò	<i>donner</i>	De92
Saharan		Manga	ɲjò	give	Ja
Songhay		Tadaksahak	na	give	He
Bangime			ɲáw̃	give	Ha12

12.	kill, die				
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>
Kuliak		So	ɲal	to die	HC
ES	Temein	Temein	nyímùk		RCS
ES	Nyimang	Afitti	nì	kill	RCS
Saharan	East	Beria	níí, nów	<i>mourir</i>	JC04
Saharan	West	Kanuri	nú-kin	die	Cy94
Bangime			yáá	die	Ha12

### 3. Nilo-Saharan resemblances to Bangime and Dogon

Apart from specific resemblances between Bangime and Dogon, there are a few lexical items attested in both, or attested only in Dogon and not in Bangime. The assumption is that when Dogon expanded, it also assimilated speakers of Nilo-Saharan languages and borrowed a small corpus of lexical items.

13.	spear, war	stick				
Family	Subgroup	Language	Attestation	Gloss	Source	
Kuliak		So	bəl	club, stick	HC	
Shabo		Shabo	ʃako	spear	Jo11	
Koman		Gwama	pàí	stick	KR11	
Bertha		Mayu	ber	spear, war	B-G07	
ES	E Jebel	Molo	wər	spear	Be97	
ES	Surmic	Mursi	ber	spear	TYO08	
ES	Nilotic W	Pari	abɛɛla	stick	Sp60	
ES	Nilotic E	Ongamo	na.βere	spear	VH89	
ES	Tama	Sungor	bárá	spear, war	Ed91b	
Kadu		Keiga	ʃáálá	spear	Sch94	
Kadu		Mufo	ʃaala	stick	Sch94	
Furan		Amdang	bal	<i>couteau</i>	Wo10	
CS		Fer	bànd	<i>bâton</i>	Bo87	
CS		Bongo	bél	<i>bâton</i>	PN	
CS		Madi Lokai	pere	stick	B100	
Saharan	West	Manga	béllám	barbed spear	Jarrett (n.d.)	
Songhay	North	Tadaksahak	bélleen	to fight	He	
Bangime			bòřá	stick	Ha12	
Dogon		Toro Tegu	béré	stick	He	

The following tables show some of the likely borrowings into Dogon proper, not attested in Bangime.

The polysemy between ‘war, stick, fight, spear’ is well attested in Nilo-Saharan, and the connection with the Dogon forms for ‘fight’ etc. looks reasonable.

14.	war, stick					
Family	Subgroup	Language	Attestation	Gloss	Source	
Shabo		Shabo	gum	stick	Jo11	
Gumuz		Metemma	g <sup>w</sup> omba	stick	Ah04	
Kuliak		Nyang’i	kɛmon	war	He76	
Kuliak		So	kɛm-an	quarrel, war	HC	
ES	Surmic	Mursi	kaman	war	TYO08	
ES	E Jebel	Aka	gumbuga	stick	Be98	
CS	MM	Moru	kumba	war	WB99	
Saharan	East	Sagato	ku	war	Pe87	
Saharan	East	Sagato	kuma	shaft of spear	Pe87	
Saharan	East	Beria	kú	<i>lance, fleche, guerre</i>	JC04	
Saharan	West	Manga	kəriwù	war, battle	Ja	
Songhay	South	Hombori	gòbò	stick	He	
Songhay	South	Zarma	gòdbù	<i>bâton</i>	BW94	
Dogon		Toro Tegu	kòmó	fight, war	He	
Dogon		Jamsay	kòmó táá <sup>n</sup>	fight, war	He	



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15.	#turu	five				
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>	<b>Attestation</b>	<b>Gloss</b>	<b>Source</b>	
Shabo		Shabo	tuul <sup>2</sup>	five	Jo11	
Koman		T'wampa	múdhèf	five	DK	
Kuliak		Ik	tud-on	be five	He99	
ES	Surmic	Majang	tuul	five	Jo11	
ES	Taman	Tama	tór	six	Ed91b	
Kadu		Keiga	tool	one	Sch94	
Maban		Maba	túur	five	Ed91a	
CS	MM	Madi	tòú	five	Bl00	
Saharan		Manga	úwù	<i>cinq</i>	Ja	
Dogon		Toro Tegu	túru	one	He	
Dogon		Jamsay	túru	one	He	

**Commentary:** The shift to 'six' in Tama group languages is unusual, but the segmental similarity to 'five' elsewhere makes it likely. Keiga *tool* resembles other NS roots for 'five' strongly and if so would correspond to the same semantic shift in Dogon languages.

16.		fat, oil		<b>Attestation</b>		<b>Gloss</b>	<b>Source</b>
<b>Family</b>	<b>Subgroup</b>	<b>Language</b>					
Koman		T'wampa	<u>k</u> <sup>v</sup>	á l ā ɲ		fat	DK
Kunama		Kunama		a ɲ a		fat of meat	Be01
ES	Nilotic E	Bari		ɲ i r e t			Sp60
ES	Nubian	Debri		a ɲ e r		fat	B-G89
ES	Ama	Ama		ɲ u m		oil	Ki96
Maba		Masalit		ɲ a m i		oil	Ed91a
Songhay		Zarma		ɲ óo n		<i>oindre</i>	DC78
Dogon		Jamsay		n ũ ɲ		oil	He
Dogon		Perge Tegu		n ù ɲg ú		oil	He

<sup>2</sup> ?< Majang

17.	#kVla	horn			
Family	Subgroup	Language	Attestation	Gloss	Source
Shabo		Shabo	ƙare	horn	Jo11
Koman		Opuo	kìw	horn	Si13
Gumuz		Guba	ƙəla	horn	Ah04
Kunama		Kunama	giì'là	horn	Be01
ES		Nara	kè'lli	horn	Ha00
ES	Surmic	Chai	kere	horn	Yi01
ES	Nilotic S	Nandi	kùùyn.éét	horn	CC01
ES	Ama	Ama	gurfì	horn	Be00
ES	Ama	Afitti	g <sup>w</sup> ùrtùn	horn	Be00
CS	MM	Moru	k <sup>w</sup> ɔyi	horn	WB99
CS	SBB	Gula Mere	kwàzù	<i>corne</i>	Bo00
CS	SBB	Bagirmi	kàdʒà	horn	Bo00
Songhay	North	Tadaksahak	hillí	horn	He
Songhay	South	Hombori	hìlà	horn	He
Dogon		Toro Tegu	círà	horn	He
Dogon		Perge Tegu	kíré	horn	He
Dogon		Nanga	kírâ	horn	He

18.	lake, well	river			
Family	Subgroup	Language	Attestation	Gloss	Source
Koman		Gwama	káálá	lake	KR12
Gumuz		Agelo Meti	kurima	lake	Ah04
Kuliak		So	kul <sup>3</sup>	lake, pool	HC
ES	Surmic	Majang	gɔrɔ	river	Jo11
ES	Nilotic W	Lango	kòt	rain	Ok12
ES	Nilotic E	Bari	kudu	rain	Sp60
ES	Nubian	Birgid	kolli	well n.	Th77
ES	Daju	Nyala	kore	rain	Th81
ES	Tama	Tama	kúl	water	Ed91b
Kadu		Miri	kiri	river	Sch94
Furan		Fur	koro	water	Wa10
Mabaan		Masalit	kúrtî	well	Ed91a
CS	MM	Moru	gɔlɔ	river	WB99
CS	SBB	Baka	kàrà	<i>mare</i>	Bo00
CS	SBB	Bongo	ngùlù	<i>eaux profondes</i>	PN
Saharan	East	Beria	kéí	<i>petit lac</i>	JC04
Saharan	West	Kanuri	kulúwu	pool, pond, lake	Cy94
Songhay	South	Zarma	gòdùrú	<i>rivière, ruisseau</i>	BW94
Dogon	Jamsay		góró	river	He
Dogon	Perge Tegu		góóró	river	He
Dogon	Nanga		góró	river	He

This might be a direct borrowing from Songhay rather than the retention of a Nilo-Saharan substrate.

<sup>3</sup> Unless < Karimojong

#### 4. And the explanation is?

Chance would seem highly unlikely as an explanation for these resemblances. Two possible explanations can be suggested; that Bangime simply *is* a Nilo-Saharan language, or that it assimilated Nilo-Saharan lexicon when a now vanished branch of that phylum was assimilated. The first explanation is not very credible; Bangime shows almost no traces of Nilo-Saharan morphology; characteristics such as ‘vanishing t/k’ and three-way plural systems are absent. Moreover, the cognates with Nilo-Saharan do not appear to show any regular sound-correspondences. So a substrate is much more likely.

There is some evidence for a stratification of borrowings into Dogon and Bangime, which is likely to be a result of the later expansion of Dogon into the Bangime area. Dogon itself does have a marked feature highly reminiscent of Nilo-Saharan languages, the erosion of C<sub>1</sub> and then C<sub>2</sub> resulting in basic lexemes with VCV and VV canonical forms. Examples of this are;

	Tommo-So	Perge Tegu	Yanda Dom
right	ɲɲé	ɲɛ́ɛ	ɲè
	Tommo-So	Jamsay	Togo Kan
give	óbo	óó	ó

This type of reduction is highly characteristic of Nilo-Saharan and not at all typical of Niger-Congo, where C<sub>1</sub> is almost always retained, and prefixes or stem-final syllable are eroded. However, this is not a claim that Dogon *is* Nilo-Saharan, indeed it clearly is not, to judge by its grammar and other morphology. This type of reduction could be purely typological. However, in the light of evidence for a Nilo-Saharan substrate, it does not seem unreasonable to suppose this reflects parallel processes in Dogon and the now-vanished branch of Nilo-Saharan, reflecting pervasive bilingualism in the past.

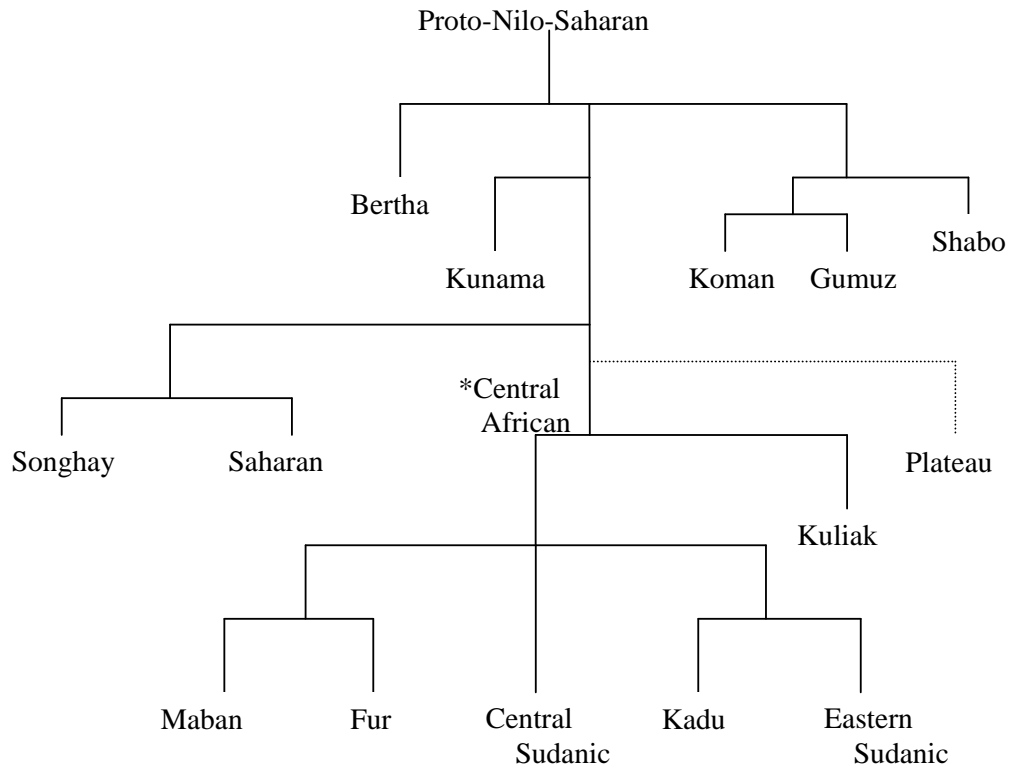
#### 5. The place of the ‘lost branch’ within Nilo-Saharan

The tables of lexical data point to a Nilo-Saharan substrate in Bangime and to a lesser extent in Dogon, which derives from the assimilation of the ‘lost branch’ following the Dogon expansion. However, there is no evidence for a relationship with any specific branch of Nilo-Saharan, in particular none with Songhay, which is geographically closest. This argues that at the earliest phase of the expansion of Nilo-Saharan an independent group migrated westward from the heartland and established settlements on the Dogon Plateau. Bangime and its relatives may have been present at this time, but this can be only speculation. For this reason, I tentatively name this lost branch ‘Plateau’.

Awaiting further analysis, Plateau is treated as an independent branch of Nilo-Saharan, diverging at roughly the same level as Saharan. The internal structure of Nilo-Saharan is highly controversial (see evaluation in Blench 2002) and cannot be discussed here. Both published proposals (Bender and Ehret) now seem very dated in the sense that they do not incorporate the extraordinary body of new data that has appeared in the last decades<sup>4</sup>. I have proposed a new internal structure for the phylum in various conference talks, and on this basis, Figure 1 presents a new proposal for the structure of Nilo-Saharan incorporating a Plateau branch;

<sup>4</sup> Though Ehret (2014) continues to write as if his model of the phylum were widely accepted.

**Figure 1. A hypothetical structure for Nilo-Saharan**



It should be made very clear this is a first approach to the data. Lexical material on Bangime and Dogon is now quite abundant and it should be possible to find and evaluate further potential evidence for this hypothesis, especially in the field of grammar.

**SHORT FORMS FOR BIBLIOGRAPHIC REFERENCES**

<b>Acronym</b>	<b>Expansion or source</b>	<b>Language treated</b>
Ah04	Ahland (2004)	Gumuz dialects
B-G07	Benishangul-Gumuz Language Development Project (2007)	Bertha
Be81	Bender (1981)	Nilo-Saharan
Be83	Bender (1983)	Proto-Koman
Be97	Bender (1997)	Nilo-Saharan
Be98	Bender (1998)	Eastern Jebel
Be00	Bender (2000)	Afitti
Be01	Bender (2001)	Kunama
Bl00	Blackings (2000)	Madi
Bo87	Boyeldieu (1987)	Fer & Yulu
Bo93	Boyeldieu (1993)	Sara-Bongo-Bagirmi
Bo00	Boyeldieu (2000)	Sara-Bongo-Bagirmi
Bo08	Boyeldieu (2008)	Daju
BW94	Bernard & White-Kaba (1994)	Zarma
Ca98	Capen (1998)	Luo
CC01	Creider & Creider (2001)	Nandi
Cr81	Creissels (1981)	Songhay
Cy94	Cyffer (1994)	Kanuri
Da03	Dahab et al. (2003)	Maba
De92	Demolin (1992)	Mangbetu
Di88	Dimmendaal (1988)	Proto-Nilotic
DC78	Ducroz & Charles (1978)	Songhay Kaado
DD	Didier Demolin (ined.)	Lese
DK	Don Killian (ined.)	T'wampa
Ed91a	Edgar (1991a)	Maba group
Ed91b	Edgar (1991b)	Tama group
Gr63	Greenberg (1963)	Nilo-Saharan
Gr72	Gregersen (1972)	Kongo-Saharan
Ha78	Haaland (1978)	Formona
Ha00	Hayward (2000)	Nara
Ha12	Hantgan (2012)	Bangime
HC	Heine & Carlin (n.d.)	So
He	Jeffrey Heath	Dogon, Songhay
He37	Heasty (1937)	Shilluk
He76	Heine (1976)	Kuliak
He99	Heine (1999)	Ik
Ja	Jarrett (n.d.)	Manga
JC04	Jakobi & Crass (2004)	Beria
Jo11	Jordan et al. (2011)	Shabo

<b>Acronym</b>	<b>Expansion or source</b>	<b>Language treated</b>
Ki96	Kingston (1996)	Ama
KR11	Kievit & Robertson (2011)	Gwama
LeC50	Le Coeur (1950)	Teda
LV39	Lukas & Volckers (1939)	Mimi
Ma04	Mada et al. (2004)	Gaam
No89	Nougayrol (1989)	Aiki
Ok12	Okonye (2012)	Lango
Pa04	Palayer (2004)	Kenga
Pe87	Petracek (1987)	Sagato
PN	Nougayrol (ined.)	Bongo
RCS	Roland Stevenson mss.	Nilo-Saharan, Kordofanian
RMB	Author's fieldwork	
Ro82	Rottland (1982)	Southern Nilotic
Sch81a	Schadeberg (1981a)	Talodi Kordofanian
Sch81b	Schadeberg (1981b)	Heiban Kordofanian
Sch94	Schadeberg (1994)	Kadu
Si13	Silfhout (2013)	Opo
Sp60	Spagnolo (1960)	Pari
Th81	Thelwall (1977)	Birgid
Th81	Thelwall (1981)	Proto-Daju
TYO08	Turton et al. (2008)	Mursi
Vo82	Vossen, 1982	Proto-Eastern Nilotic
Vo82	Voßen (1982)	Eastern Nilotic
Vo88	Voßen (1988)	Maa
Vo97	Voßen (1997)	Khoisan
VH89	Vossen & Heine (1989)	Ongamo
Wa10	Waag (2010)	Fur
We27	Westermann (1927)	Western Sudanic
We87	Werner (1987)	Nobiin
We93	Werner (1993)	Meidob
Wo10	Wolf (2010)	Amdang
WB99	Watson & Boone (1999)	Moru Mangbetu
Yi01	Yigezu (2001)	Surmic

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