



Comparative and Contrastive Analysis of Vowel Harmony in Asante and Akuapem Twi Dialects in Ghana

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Abstract

This paper examined the vowel harmony in Akan with particular reference to Asante and Akuapem dialects. The purpose was to compare Akuapem and Asante vowel harmony to see which of the two focuses more or conform to the use of Akan vowel harmony. The study confined itself with secondary data. Other authorities work were reviewed and then put side by side with Akan dialect. In the opinion of Obeng- Gyasi vowels of similar environment share common features with one another. Comparatively, he seems to share similar ideas with others like (Adomako, 2013) and (Agyekum, 2010), (Kpodo, 2015) and (Hayes, 2009). The theory that influenced this investigation was Vowel harmony and Correspondence theory. This theory covers the major issues in the generative analysis of vowel harmony and vowel typology. It account for the most prominent features of vowel harmony system such as root control and affix control, which takes the center stage of Asante and Akuapem dialects in terms of vowel harmony. After thorough comparative analysis of evidential data, it was realized that, with Akuapem dialect when the vowel in the root is +ATR it normally affects the vowel in the prefix causing it to assume similar quality. But Asante deviates from this.

Keywords: Akuapem, assimilation, +ATR, -ATR, comparative, dialects, features, harmony



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1.0 Introduction

Akan is one of the most widely spoken languages of the Kwa sub-branch of the Niger- Congo family. It is made up of many dialects including Asante spoken in the Ashanti region; Kwahu, Akyem and Akuapem in the Eastern region, Bono in the Brong Ahafo region, and Wassa in the Western region of Ghana. Fante and Assin are spoken in the central region of Ghana. Out of the number of the dialects mentioned above, three main ones are documented and they are Asante, Akuapem and Fante. These three dialects are all mutually intelligible. It is the articulation of the sounds of the language that leads to production of the speech of the language (Roach, 2010). The sound of every language are vowels and consonant. Akan has fifteen consonants and seven vowels. However, this work limits itself to the vowels of the language. As mentioned earlier, there are seven vowels in Akan used orthographically. Phonologically they are ten as a result of the fact that sounds such as /a/, /e/ and /o/ come with two sounds each (Dolphyne, 2006). This study critically examine and analyses vowel harmony in Akan with much emphasis on the comparison between Akuapem and Asante Twi.

2.0 Theoretical Framwork

The theory that influenced this investigation was Vowel harmony and Correspondence theory. This theory covers the major issues in the generative analysis of vowel harmony and vowel typology. It account for the most prominent features of vowel harmony system such as root control and affix control, which takes the center stage of Asante and Akuapem dialects in terms of vowel harmony. According to Hayes. (2009) many languages particularly in sub- Saharan Africa distinguish vowels with a feature called (Advanced Tongue Root), abbreviated (ATR). This feature is often involved in Vowel Harmony System- roughly all the vowels in a particular word must be either [+ATR] or [-ATR].

3.0 Literature Review

Abercrombie (1967). Vowel and consonant are traditional categories deriving ultimately from the Greek grammarians. The air so expelled needs for its escape to the outer air a relatively free and unrestricted passage through the vocal tract, and it is this moment of least restriction in the sequence of movements that make up the syllable that is the vowel. A vowel is the nucleus or central part of the syllable. Katamba (1998) posits that vowel harmony is a process whereby within a certain designated domain, usually the words or vowels are required to share one or more phonological features. The vowels of a language are divided into two exclusive sets and all vowels within a stipulated domain must be either front or back, high or low,

round or unrounded. Ladefoged, P. (2006) said, Differences in vowel quality can usually be described in terms of variations in the degrees of height, backness, and lip rounding. He further explained that, In the one set, there are vowels in which the root of the tongue is drawn forward and the larynx is lowered, so that the part of the vocal tract in the pharynx is considerably enlarged. These vowels are called advanced tongue root. (or more simply +ATR) vowels. In the other set, there are vowels in which there is no advancement of the tongue root or lowering of the larynx (-ATR vowels). Vowel harmony as a type of assimilation where vowels come to share certain features with other vowels of the same class. Obeng –Gyasi (1994:168). Gussmann, E. (2002) states that, to deal with vowel harmony we need to take a closer look at all the vowels in the language. He mentioned among other things that, the requirement that only specified vowels can follow other vowels within a word is referred to as vowel harmony. The existence of such harmony is of general significance for the language, which can be seen in the fact that when suffixes attach to stems, their vowels must adjust to stem vowels in particular ways. O’Keefe (2004) defines harmony as systematic co-occurrence restriction. In other words, a language exhibiting vowel harmony will generally have two sets of vowels whose co-occurrence is highly marked. Akan in fact, has two varieties of harmony: Tongue root position, and lip rounding. Kpodo. (2015) defines vowel harmony as a phonological processes in which vowels are required to agree in terms of one of the features within a specific domain usually, the prosodic word. Vowel harmony is considered as a long distance assimilation process. Since vowels are usually harmonized across intervening consonant segments or sounds and sometimes, even across non-harmonic vowel segment. Hayes. (2009) many languages particularly in sub- Saharan Africa distinguish vowels with a feature called (Advanced Tongue Root), abbreviated (ATR). This feature is often involved in Vowel Harmony System- roughly all the vowels in a particular word must be either [+ATR] or [-ATR]. It is not yet clear whether [Advanced Tongue Root] is to be considered the same feature as [tense]. Occasionally phonologist use [ATR] instead of [tense] in describing English and other European Language. Tenseness harmony in Akan is not confined to single formatives. It generally characterizes sequences of root morphemes and adjacent grammatical morphemes within word boundaries, and applies, in a more limited way, across word boundaries. (Schachter, P. & Fromkin, V. 1968). Adomako and Issah. (2013). The term vowel harmony is used in two different senses. In the first sense, it refers to any type of long distance assimilatory process of vowels, either progressive or regressive. Vowel harmony is a type of long-distance assimilatory phonological process involving vowels that occur in some languages. It is against this back drop that, I have decided to compare the two dialect in terms of vowel harmony to know their positions.

Vowel harmony has been discussed in many articles dealing with the phonology of Akan. Stewart (1967) discusses the phonetic realization of what we are calling "tenseness", and presents apparently conclusive evidence for his position, which he summarizes as follows:

The vowels of Akan fall into two sets on the basis of vowel harmony: ɪ, [a], ʊ and e, i, æ, o, u. The relation of the first set to the second is one of unmarked to marked, so that one would expect to find a constant articulatory feature extending throughout harmony spans with i, e, [ɔ, u. Tongue raising is unacceptable because there is no constant tongue height, and tenseness is unacceptable as in the unmarked vowels laxness is conspicuously absent. Advancing of the root of the tongue on the other hand, is acceptable, and appeals to account, moreover, for all the phonetic phenomena which have been found to be associated with this particular type of vowel harmony. (p. 202).

Vowel harmony is an assimilatory process, (Essien 1990, Hyman 1975, Aoki 1968, Katamba 1993, Lass 1984) and not just a co-occurrence restriction on the distribution of vowels in words, as construed by Ofori (2004), Dolphyne (1988) and Kenstowicz (1994). Vowel harmony should be considered as a phonological process and not a phonological state. The Akan vowel harmony can be described as a phonological process of regressive assimilation. This is similar to vowel harmony in Larteh by Ofori (2004). In this phonological process, advanced vowels assimilate unadvanced vowels that precede them. Almost all the Akan words discussed in Dolphyne (1988) as exceptions to the Akan vowel harmony rule have unadvanced vowels preceded by advanced ones. Dolphyne (1988) therefore tends to have more exceptions to the Akan vowel harmony than rules. She discusses two types of vowel harmony (i.e. tongue root position and lip rounding). She however discusses six types or groups of words as exceptions to the Akan vowel harmony rule. It is little wonder that O'Keefe (2003) describes the Akan vowel harmony as full of seeming exceptions. It is based on these exceptions that we have decided to compare two dialects of Akan language through data analysis to ascertain which dialect is more vowel harmonic. According to Boadi (2009), the dialects being described here have a vowel-harmony system of the cross-height type (Stewart, 1971, 1989). A completely symmetrical vowel-harmony system of the cross-height type would have the following two harmonizing sets;

a) i u e o æ

b) ɪ ʊ] [a

Normally, only the members of one set can co-occur in a root morpheme of two or more syllables. With minor but systematic exceptions, the occurrence of vowels in prefixes is restricted in a similar manner. According to Boadi reduced pronominal forms as well as noun and verb prefixes have at least two alternant each, and their selection is conditioned by the feature specifications of the vowels in the root. Do Asante and Akuapem obey the assertion?

4.0 Methodology

The data collection instrument used was secondary source of data. I reviewed other authorities work and based on the review I then put them side by side with Asante and Akuapem dialects. In the opinion of Obeng- Gyasi vowels of similar environment share common features with one another. Comparatively, he seems to share similar ideas with others like; (Ofori, 2004), (Ladefoged, 2006), (Boadi, 2009). Antwi – Danso’s proposition is almost the same as those authorities who shared their ideas on vowel harmony earlier. However, to her vowel harmony seems to be regressive assimilation. According to Adomako and Issah vowel harmony is used in two different senses. In the first sense, it refers to any type of long distance assimilatory process of vowels, either progressive or regressive. Vowel harmony is a type of long-distance assimilatory phonological process involving vowels that occur in some languages. Ladefoged, P. (2006) said, Differences in vowel quality can usually be described in terms of variations in the degrees of height, backness, and lip rounding. He further explained that, in the one set, there are vowels in which the root of the tongue is drawn forward and the larynx is lowered, so that the part of the vocal tract in the pharynx is considerably enlarged. These vowels are called advanced tongue root (or more simply +ATR) vowels. In the other set, there are vowels in which there is no advancement of the tongue root or lowering of the larynx (-ATR vowels).

5.0. Findings

Based on these views of the above authorities concerning vowel harmony and add my voice. To me, vowel harmony is the distribution of vowels which share the same features that is +_ ATR, +_Height and +_ Round to occur in the same domain. For example, +ATR vowels should not mix with -ATR vowel in the same domain. For instance in a root- controlled (ATR) vowel harmony, when the root vowel is -ATR all vowels in the domain become – ATR and when the root vowel is +ATR all the vowels in the domain become +ATR. One important aspect which is worth noting as far as harmony is concerned is the trigger and target relationship. Thus, it is the vowel quality in the root that determines the vowel quality in the prefix. This is because the trigger is always found in the root whereas the target is found in the prefix. Although

vowel harmony comes in three form, namely; +_ ATR, +_Height and +_Round. This work emphasizes on +_ATR harmony. Phonologically Akan has ten vowel sounds [a, æ, e, i, ɪ,], [o, u, ʊ].

These vowel sounds can be grouped into two according to their ATR quality. For example.

Table 1

+ATR	- ATR
\i\	\ɪ\
\e\	\a\
\o\	\ɔ\
\u\	\ɛ\
\æ\	\ʊ\

In the root- controlled harmony system, it is the harmonic feature in the root segment that determines the harmonic feature value of the entire domain. In vowel harmony, only vowels from the same group (either + ATR or – ATR) are permissible in a word. For example.

Table 2

+ATR	GLOSS	-ATR	GLOSS
[kukuo]	Pot	[[dan]	building
[buroni]	White man	[adamfu]	friend
[efie]	house	[abiranti]	boy
[owuo]	death	[ab]fra]	child
[pætuo]	owl	[l]]rɪ]	vehicle
[etuo]	etuo	[]w]]	snake

With the root – controlled harmony, the vowel quality in the root word determines the vowel quality in the prefix. The following data analysis exemplifies the aforementioned statement.

Vowel Harmony with Verbal affixes Future tense marker [bɛ]

AKUAPEM.

Table 3

+ATR	GLOSS	-ATR	GLOSS
[bedi]	will eat	[b[k]]	will go
[besu]	will cry	[b[suɱ]]	will serve
[behu]	will see	[b[fa]]	will take
[betu]	will uproot	[b[ku]]	will fight
[bekum]	will kill	[b[tu]]	will throw
[behunu]	will see	[b[t]]	will buy
[bebuie]	will open	[b[ka]]	will say

ASANTE

Table 4

+ATR	GLOSS	-ATR	GLOSS
[b[di]]	will eat	[b[fa]]	will take
[b[su]]	will cry	[b[da]]	will sleep
[b[hunu]]	will see	[b[ku]]	will fight
[b[tu]]	will uproot	[b[k]]	will go
[b[kum]]	will kill	[b[suɱ]]	will serve
[b[to]]	will throw	[b[t]]	will buy

Considering the data above, I can see that the two dialects of Akan (Akuapem and Asante Twi) use the future marker [bɛ]. However, at a point the [bɛ] which is the future tense marker varies in its usage. In Akuapem when the vowel in root is an advanced vowel, the vowel quality in the prefix assumes the features of the vowel quality in the root. Example in the verb [di] 'eat' the vowel [i] which is the trigger affects the vowel in the prefix which is the target for it to become [e] so that the word becomes [bedi] instead of [b[di]] will eat. However, when the vowel in the root is unadvanced vowel then the vowel quality in the prefix that is [ɛ] remains unchanged so that it will be harmonised with the vowel in the root. Example [da] 'sleep' maintains [bɛ] and becomes [b[da]] 'will sleep'. On the other side the situation in Asante Twi is quite different in terms of vowel harmony. Here when the vowel in the root word is unadvanced. It can take a prefix which has advanced vowel.

In this sense, vowel harmony does not apply. Example **[b[di]** will eat, **[b[wu]** will die. In related development you can have a root word where the vowel can be unadvanced with the prefix having a vowel with unadvanced vowel quality. This means that vowel harmony has eventually taken place, example **[b[da]** ‘will sleep’, **[b[kɔ]** ‘will go’, **[b[fi]** ‘will vomit’ and **[b[wɔ]** ‘will give birth’.

The Past Perfect Tense

We can also have vowel harmony that features prominently in past perfect tense in Akan. These are the examples;

Table 5 **+ATR**

AKUAPEM	GLOSS	ASANTE	GLOSS
[ædi]	has eaten	[ædi]	has eaten
[æsu]	has cried	[æsu]	has cried
[æhu]	has seen	[æhu]	has seen
[ækum]	has killed	[ækum]	has killed
[æsi]	has washed	[æsi]	has washed

Table 6 **-ATR**

AKUAPEM	GLOSS	ASANTE	GLOSS
[ada]	has slept	[ada]	has slept
[anɔm]	has drunk	[anɔm]	has drunk
[aka]	has bitten	[aka]	has bitten
[ad]]	has weeded	[ad]]	has weeded
[asa]	has finished	[asa]	has finished

The data above shows that in both Akuapem and Asante Twi, the vowels in the roots share the same features that is both advanced and unadvanced vowels. Therefore, it can confidently be observed that, both Asante and Akuapem Twi follow the rules of vowel harmony in relation to perfect tense.

Progressive Tense Marker

The progressive in Akuapem and Asante is marked by the prefix ‘re’ which is surface representation but phonological /underlying representation is denoted by /rɪ/. The following are examples:

+ATR

Table 7

AKUAPEM	GLOSS	ASANTE	GLOSS
[ridi]	is eating	[oodi]	he is eating
[risu]	is crying	[oosu]	he is crying
[ritu]	is flying	[ootu]	he is flying
[ritie]	is listening	[ootie]	he is listening
[riwu]	is dying	[oowu]	he is dying

-ATR

Table 8

AKUAPEM	GLOSS	ASANTE	GLOSS
[rida]	is sleeping	[da]	he is sleeping
[rik]	is going	[k]	he is going
[risiri]	is laughing	[siri]	he is laughing
[rit]	is buying	[t]	he is buying

It can be observed from the above data that, in the Akuapem dialect the progressive verbal prefix /ri/ maintains its vowel quality when it is preceded by a root with advanced vowel. Also the progressive verbal prefix /rɪ/ maintains its vowel quality when it is preceded by a root with unadvanced vowel. On the other hand, in the Asante dialect, the vowel in the prefix is assimilated to assume the vowel quality in the root, while it lengthens the vowel.

The Past Tense

In Akan there are so many ways to express verbs in the past. When vowel in certain verbs reoccur being +ATR or –ATR without changing its form, vowel harmony is said to have taken place.

Example, vowel sequence of the same vowel

Table 9 Both Akuapem and Asante

[k]	go	[k]]	went
[di]	eat	[dii]	ate
[su]	cry	[suu]	cried
[tie]	listen	[tiee]	listened

Vowel harmony in the pronominal verbal affixes

In Akan, when a personal pronoun is performing subject function it is written together with the verb as one word. In this case, the pronoun becomes a prefix to the verb which is the root. Below are examples:

Table 10

pronoun	gloss	verb	gloss	word	gloss
mɪ	I	fa	take	mɪfa	I take
wɔ	you	yɪ	do	wɔyɪ	you do
ɲɔ/[nɔ]	he/she/it	di	eat	Odi(Ak)/ɲdi(As)	he/she/it eats
yɪn	we	bu	break	yɪbu	we break
mɔ	you	da	sleep	mɔda	you sleep
wɪn	they	num	drink	wɪnum	they drink

Akuapem (+ATR Harmony)

Table 11

Pronoun	Gloss	Verb	Gloss	Word	Gloss
mɪ	I	di	eat	mɪdi	I eat
wɔ	you	su	cry	wɔsu	you cry
ɲɔ/[nɔ]	he/she/it	bu	break	obu	he/she/it breaks
yɪn	we	wu	die	yewu	we die
mɔ	you	si	wash	musi	you wash
wɪn	they	yi	remove	woyi	They remove

Akuapem (-ATR Harmony)

Table 12

Pronoun	Gloss	Verb	Gloss	Word	Gloss
mɪ	I	kɪ	go	mɪkɪ	I go
wɔ	you	da	sleep	wɔda	you sleep
ɲɔ/[nɔ]	he/she/it	pɪ	like	ɲpɪ	he/she/it likes
yɪn	we	hwɪ	look	yɪhwɪ	we look
mɔ	you	sa	dance	mɔsa	you dance
wɪn	they	sɪrɪ	laugh	wɪsɪrɪ	they dance

Asante (+ATR Harmony)

Table 13

Prouon	Gloss	Verb	Gloss	Word	Gloss
mɪ	I	di	eat	mɪdi	I eat
wʊ	you	bu	break	wʊbu	you break
ɲu/ɲu	he/she/it	duru	reach	ɲduru	he/she/it reaches
yɲ	we	yi	remove	yɲyi	we remove
mʊ	you	tie	listen	mʊtie	you listen
wɲ	they	bue	open	wɲbue	they open

Asante (-ATR Harmony)

Table 14

Pronoun	Gloss	Verb	Gloss	Word	Gloss
mɪ	I	sa	fetch	mɪsa	I fetch
wʊ	you	kʊ	fight	wʊkʊ	you fight
ɲu/ɲu	he/she/it	tu	throw	ɲtu	he/she/it throws
yɲ	we	tɪ	plug	yɲtɪ	we plug
mʊ	you	fɪ	vomit	mʊfɪ	you vomit
wɲ	they	dɪ	weed	wɲdɪ	they weed

From the above data, it was realized that vowel harmony takes place in Akuapem Twi. By implication when we have an advanced vowel in a verb there should be another advanced vowel in the prefix or a pronoun which is attached to the root verb to form a word. This means that, the vowel in the root verb should trigger the target that is the verb in the pronominal prefix. This is clearly illustrated in +ATR table 11 above. However, this is not the case in Asante. Table 13 shows that in Asante, the vowels in the root verb do not trigger the vowels in the prefixes to harmonize. In both Akuapem and Asante, there is always harmony when pronominal prefixes are attached to unadvanced. This is clearly illustrated in tables 12 and 14.

Vowel Harmony in Nominal Prefix

In both Akuapem and Asante, vowel harmony is realized in nominal prefixes that are attached to the nouns which always assume the vowel quality of the vowels in the root.

Example;

Table 15

+ATR		-ATR	
Noun	Gloss	Noun	Gloss
[e-fie]	house	[-dan]	building
[o-wuo]	death	[]-k[t]	crab
[o-buo]	respect	[]-sib]	tiger
[o-buroni]	white man	[a-fafrant]	butterfly
[e-sie]	anthill	[a-br]fu]	white men

The examples above at the left hand side explains how certain nouns take prefixes to portray vowel harmony in both Akuapem and Asante Twi. Here, the prefix are said to be +ATR whereas the vowels in the root are all +ATR. In contrast. The examples at the right hand side also explains how vowel harmony takes place in –ATR. Here, the prefixes are all –ATR as the vowels in the root are also –ATR conforming to the vowel harmony rules.

6.0 Conclusion

In this paper, an attempt has been made to discuss what vowel harmony in Akan is, more particular in the domains of Akuapem and Asante dialects. The brief background of Akan in which our attention was directed to discuss the dialect of Akan which led to the comparative and contrastive analysis of vowel harmony behavior in Asante and Akuapem Twi dialects. It was analyzed what scholars have contributed immensely on the subject under discussion. With this, we have studied the differences and similarities among the two dialects Asante and Akuapem in relation to vowel harmony. Upon thorough discussion and analysis couple with head to head comparisons, the paper has established that though, both languages are Akan dialects, to some extent vowel harmony feature in varies. For instance, this paper has established that in both Akuapem and Asante dialects, when the vowel in the root is –ATR, most often than not it agrees with the vowel in the prefixes. However, the situation reverses whenever the vowel in the root is +ATR it does not necessarily conform to the vowel in the prefixes that are attached to the root. In this case, vowel harmony does not take place. This happens in Asante Twi dialect. On the other hand, with Akuapem Twi dialect when the vowel in the root is +ATR it normally affects the vowel in the prefix triggered the target or caused it to assume similar quality. It can therefore conclude that the Akuapem dialect conforms and uses vowel harmony more often than that of Asante dialect.

References

- Abercrombie, D. (1969). *Elements of General Phonetics*. London: Aberdeen University Press Ltd.
- Adomako, K. & Issah, S. A. (2013). *Introduction to Linguistics*. Koforidua: Pedaddo Ventures P.O.Box Kf 2701.
- Antwi- Danso, J. P. (2010). *Some Morphological Processes in Akan- Twi*. VDM Verlag Dr. Mullar.
- Aoki, H. (1986). Toward a Typology of Vowel Harmony. *International Journal of American Linguistics* 34; 142-145.
- Boadi, A. L. (2009) *Phonological Study of some verbal Affixes in Seven Volta Comoe Languages of Ghana*. Accra Cantonments: Black Mask Ltd.
- Crystal, D. (1994). *A Dictionary of Language and Languages*. London: Penguin Books.
- Dolphyne, F. A. (1988). *The Akan (Fante- Twi) Language. Its Sound System and Tonal Structure*. Accra: Ghana University Press.
- Essien, U. E. (2000). *Ibibio Phonetics and Phonology*. Port Harcourt; Emhai Press.
- Fromkin, V. (1965) "On System-Structure Phonology." *Igasum*. 41,601-609.
- Gussmann, E. (2002). *Phonology Analysis and Theory*. Cambridge: Cambridge University Press.
- Hayes, B. (2009). *Introductory Phonology*. Cambridge: Cambridge University Press.
- Hyman, L. (1975). *Phonology; Theory and Analysis*. New York; Holf, Rineheart and Winston.
- Katamba, F. (1989). *An Introduction to Phonology*. New York: Longman Publishing.
- Kenstowicz, M. (1994). *Phonology in Generative Grammar*. Cambridge: Cambridge Blackwell.
- Kpodo, P. (2015). *Phonetics and Phonology: The basics*. Accra: Wyse Print Supply Limited.
- Lass, R. (1984). *Phonology: An Introduction to Basic Concepts*. Cambridge. Cambridge University Press.
- Ladefoged, P. (2006). *A Course in Phonetics*. Cambridge. Cambridge University Press.
- Ladefoged, P. (1964) *A Phonetic Study of West African Languages*. Cambridge: Cambridge University Press.
- Ofori, K. (2004). Vowel Harmony in Larteh: A Descriptive Analysis. In Kropp Dakubu. M. E. (eds) *Studies in the Language of the Volta Basin* 11; 250 – 257.
- O' Keefe, M. (2003) *Akan Vowel Harmony*; Department of Linguistics Swarthmore College.
- Owusu, S. (2002). *Phonological Processes in Akan: An Autosegmental Analysis*. Unpublished. M. Phil Theses. Department of Linguistics. UG.

- Roach, P. (2010). *English Phonetics and Phonology: Practical course*. (4th Edition). Cambridge: University Press. Cambridge.
- Schachter, P. (1961) "*Phonetic Similarity in Tonemic Analysis, with Notes on the Tone System of Akwapim Twi*." *Language* 37.231-238.
- Stewart, J.M. (1962) "*An Analysis of the Structure of the Fante Verb With Special Reference to Tone and Glottalisation*." University of London Ph.D.
- Stewart, J. M. (1971). Niger-Congo Kwa. In Sebeok, T. A. (Ed). *Current Trend in linguistics*, 7, 179-212
- Sterwart, J. M (1989). *Kwa*. In J. Bendor- Samuel (ed) 217- 246.