Original Research Article

'For the Love of the Environment' Reflections on Professional Music Practice and Climate Change in Nigeria

ABSTRACT

Aims: The aims of study are on the issues of noise pollution through professional music practice and its impact on the environment in Nigeria as this is becoming a sociological phenomenon.

Study design: The design of this study is on noise pollution through excessive sound pressure levels of music production by way of music merchandising, products promotion and live performances in indoor and outdoor venues in Nigeria. The paper reflects on the musical sound productions as a tool for power and domination of space, it further seeks to understand why music/sound professionals, government agencies and music consumers have come to accept loudness as a way of life in Nigeria.

Methodology: Data for this paper were gathered through observations of music production at social events and public places, interviews with professionals and audiences. The study was also done using a Virtual Instrument; a Sound Pressure Level mobile application installed on a mobile phone. The equivalent noise level using A-weighting was taken every fifteen minutes in each location between 6:00 am and 12:00 pm and the LAeq, T of each market center was calculated. Maximum LAeq, 6h of 105.40 dB was obtained in all the centers visited between 6:00 am and 12:00 pm while the minimum value of LAeq, 6h obtained for a residential area in the same period is 69.51 dBA. The residents are exposed to average noise levels of 75 - 98 dB (A) or more every day which is higher than the recommended value of 60 dBA by World Health Organization (WHO).

Results: The paper concludes that the acoustic treatment of performance venues, training of music professionalism centers as well as appropriate legislation on awareness creation by government, are some significant ways to check noise pollution generated from professional music practice in order to make our environment more ecologically-friendly.

Conclusion: This paper recommends that acceptable optimal standards of sound production either in enclosures or in open spaces should be established for effective sound control. More importantly, a lot of awareness and advocacy should be carried out in order to sensitize the citizenry on the dangers of very loud music which most times translate to noise.

Keywords: Environment, Reflections, Music, Practice.

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Introduction

In about 2004, the departmental band of music, Obafemi Awolowo University was contracted to play at a dinner organised by the Otolaryngological Society of Nigeria (an association for Ear, Nose and Throat doctors (ENT). As usual, we wanted to impress the audience not just with the quality of our music but also in terms of volume or amplitude of our musical equipment. As the band struck the first chord, somebody walked up and asked us to reduce the volume of the music which we did. As we continued to play, there were yet, more calls for reduction of sound pressure and volume levels until we were practically singing and playing in soft whispers before we were allowed to continue the performance. Afterwards, the doctors took time to educate us and the band on the dangers of loud music, especially as regards auditory perception and gradual loss of hearing. Their complain made very little sense to us then especially considering our acquired behaviour of professional practice where the core lesson is 'the louder the better', our instrument for creating audience awareness and domination of the musical atmosphere.

Several years later as a teacher of sound acoustics and electronics to undergraduate students, it became clearer to understand terms like 'threshold of pain', 'listeners' fatigue', 'frequency bias' (which expresses the value in megawatts per 0.1 Hertz (MW/0.1 Hz), at the same time approximates the Balancing Authority Area's response to Interconnection frequency error (as defined in the NERC Glossary) , 'grating', which is a skeletal structure designed to support or enclose an abject, it made of metal bars in the form of a grille set into a wall, pavement, etc, serving as a cover or guard, 'sympathetic vibration, 'the decibel scale' and so on, all of which represent 'danger signs' as regards loud music. It was at this point in our academic and professional practice that we came to appreciate the lessons I learnt from the ENT doctors that night.

The consensus opinion in many areas of environmental research is that the climate is changing and that the change is due mainly to human activities and their impact on the environment. Climate change caused by human activities or anthropogenic factors have given birth to a new climatic terminology referred to generally as global warming.While many physical phenomena like bush burning, gas flaring, gaseous emissions from vehicles, industries and deforestation among others, have been held accountable for climate change in various parts of the world, the impact of very loud sounds on the environment as it relates to issues in global warming and climate change have been largely ignored until very recently.

There are many different problems that are leading to climate change in Nigeria due to human musical activity. Understanding global warming and its impact is important to meet the challenges of the growing culture of loud music/noise through musical productions and merchandising and their likely impact on the environment. Debate over global warming has been an event internationally ~~going all around the world~~, while few consider it as the biggest challenge of all times, others consider it as a climate shift that occurred in early 90's and have fallen flat since then. Those who believe it have their own scientific reasons to back their claims; others have their own reasons to disregard such ~~their~~ theories. Loud music production as a global-warming pollution into the environment in Nigeria and Africa in general, with our hot atmospheric condition, calls for a serious debate.

When Al Gore first wrote his article on global warming in 2015, several arguments came up from certain scientists such as Eliot Spitzer who concluded that "global warming was real and that prior estimates of the rate of warming were correct. I'm now going a step further: Humans are almost the cause."[1]

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[1] ~~Environ Health Perspectives; 2007~~Environ Health Perspectives. 2007 November; 115(11): A536–A537.)

As a way to foreground this discussion, ~~I will let you in on~~ it is important to present the decibel scale which attempts to capture the volume of sound from various sources in modern societies (see Table1).

Table 1.**The Decibel Scale & associated noise sources**

Decibel Value	**Noise Source**	**Decibel Values & Loudness Description of Ile-Ife, Nigeria)**			
0	Threshold of hearing	Day Time		Night Time	
10	Quite whisper	Decibel	Loudness Description	Decibel	Loudness Description
20	Conversation	0-30	Excellent Quality	0-30	Excellent Quality
20-50	Quite conversation	31-40	Very good quality	31-40	Very good quality
40-45	Hotel/theatre	41-60	Good quality	41-50	Good quality
50-65	Loud conversation	61-75	Satisfactory quality	51-65	Satisfactory quality
65-70	Traffic on busy street	76-90	Unsatisfactory	66-75	Unsatisfactory
65-90	Train	91-110	Hazardous quality	76-90	Hazardous quality
75-80	Factory (light medium work)	>110	Not allowed	>90	Not allowed
90	Heavy traffic				

90-100	Thunder				
110-140	Jet plane take-off				
130	Threshold of pain				
140-190	Space rocket take-off				

Source[2] ~~*Source*~~[3] *Source : [3]*

The noise sources as listed in Table 1 are typical of a Western region in Nigeria. When placed in African context, the list will have to be extended to include sounds from mosques and churches (which are growing in leaps and bounds in modern African societies), noise of school children, sounds from record shops, street vendors, generators, light/heavy ammunitions, music merchandising/promotion, live performances, street shows and so on. It is important to observe also that, the phenomena listed in the decibel scale do not occur in isolation. For example a factory will not stop work because a jet plane is taking off; neither will noise of heavy traffic cease when thunder strikes. It therefore means that in modern societies, experiencing noise from multiple sources amounted to several decibels of sound amplitude almost on a daily basis. Again, while most of the sounds generated by the sources listed in the decibel scale exist~~s~~ momentarily, musical shows may last for several hours which translate~~s~~ to several hours of 'charging' the atmosphere with continuous vibrations of molecules of air. Among other things, this paper will reflect on the theory that loudness relates to power and domination of space and seeks to understand why music/sound professionals, government agencies and music consumers in Africa have come to accept

[2] Encarta Premium Dictionary, 2009

[3] Data Collection on Ile-Ife residents

loudness as a way of life. The paper then examines ways through which professional musical practice can contribute to issues of environmental degradation and what measures can be put in place to arrest this development.

.**Music, the Arts and Climate Change: A Review**

Although issues of climate change and global warming began more as scientific enquiries and discourses, recent history has shown that there are great academic and artistic interests in the arts and the environment. For example, in 2009, Wallace of the environmental studies programme of Ursinus College Pennsylvania compiled a list of 282 songs released by musicians on environmental issues, while photo exhibitions have been organised in other areas with thematic focus on climate change. It has also been reported that Michael Jackson was working on a song on climate change before his death[4].

Energy, climate change and impact of different music delivery methods was the focus of a study by Weber et al.[5] of the Department of Civil and Environmental Engineering, Carnegie Mellon University; Lawrence Beckley National Laboratory and Stanford University. Their study assessed the energy and carbon dioxide emissions with alternative methods of delivering one album of music to a final consumer, either through traditional retail method or via e-commerce sale of compact discs using digital download services. Additionally, they observed among other things that purchasing music digitally reduces the energy and carbon dioxide emissions by between 40-80%. This reduction is due to the

[4] Enendu, L.O.M. "Sound Recording in Theatre Planning and Installation. Ibadan: Kraft Books 1994 (pp. 24-26)

[5] Weber, L, Koomey, J. and Matthews, S. "The Energy and Climate Change Impact of Different Music Delivery Methods". U.S.A. 2007. (pp. 215-216)

elimination of CDs, CD packaging and the physical delivery of CDs to households, while still conceding to the fact that there are increasing emissions associated with internet data flows.

At the University of Cambridge, the Centre for Research in Arts, Social Sciences and the Humanities (CRASSH) a study group has focused on climate change. This interdisciplinary group explores issues surrounding climate change from an aesthetic and cultural standpoint, giving voice and platform to a growing number of artists, writers, film directors, journalists, photographers and so on. Several issues have been raised on the subject of noise pollution in Nigeria today. Many legislative arms of government have also discussed and called for immediate actions on noise pollution taking into account the health hazards of loud sound emission to millions of Nigerians. Such action was taken by the Lagos State House of Assembly through a motion '' Need for Regulation of Noise Pollution in Lagos State''[6] calling on the executive governor of Lagos to embark ~~on~~ a public enlightenment campaign to sensitise the public on the dangers of noise pollution. The Nations Newspaper also reported that Acoustics experts have warned that unless the government enforces laws that will prevent noise pollution, many individuals may become deaf[7]**.** Noise is our enemy. It is not only loud enemy of our ears; it is also an enemy to the environment as it pollutes our surroundings. Constant exposure to loud noise, experts say, affects our auditory system; especially when it is above the normal 85 decibels (dBs). Noise above the normal decibels is capable of perforating our ear membranes which can result in temporary hearing loss. Figure 1 shows a typical photograph of the types of horn speakers used by most churches, mosques and recorded music sellers in Ile-Ife and other parts of Nigeria.

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[6] www.vanguardngr accessed on July 24, 2015

[7] www.thenationonline accessed October 7, 2015

Figure 1: No Title why?

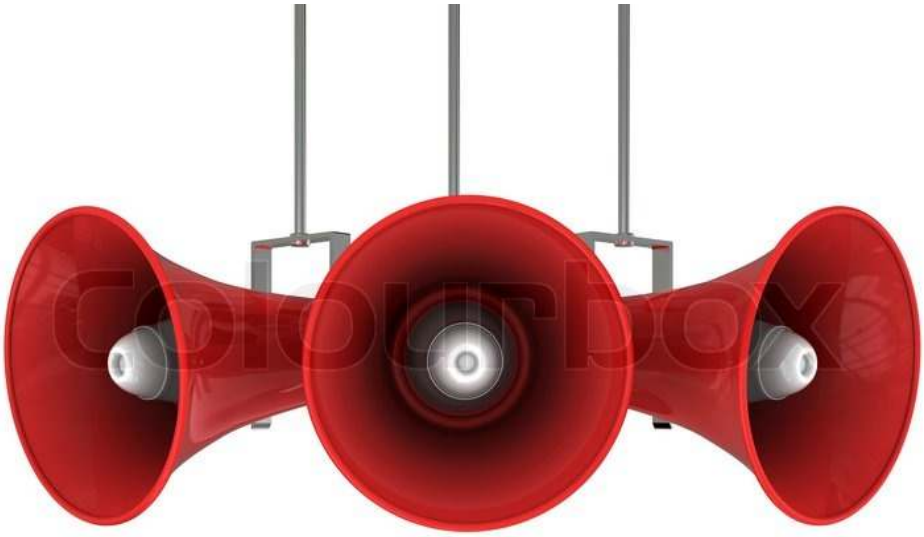

Figure 1: Typical Horn Speakers used by local churches/Mosques in the study Area (Ile Ife, Nigeria

Music by its very nature is multidisciplinary, spread across the arts, social sciences, pure and applied science, medicine and technology among others. Again, music, especially the commercially promoted type, involves a long chain of human activities and energies. From song writing to studio recording, cassette/CD duplication, live performances in theatres/ auditoria or open spaces, promotion and distribution of recorded music to the final consumer, the music production chain continually interacts with the environment as sonic, electrical, technological and industrial phenomena justifying its study as an anthropogenic factor in climate change.

Recently, eateries, fuel filling stations and motor garages are not left out in the notorious attitude of using loud sound/noise to shorten human life's span. Visits to some of these places have indicated that just at the entrance, you will be welcomed by loud sound of

more than 100~~Db~~ dB(A) emanating from the amplified speaker system which may make you to think of a birthday or other celebration is on-going in these premises. The wattage of sound emanating from those speakers will leave customers partially deaf for about 2 minutes (120 seconds) after disengaging from the eatery. This practice of loud music playing at eateries has become another channel of product advertisement and calling the attention of people, but little does the operators realise the dangers caused on the inhabitants of these areas where such eateries are is located. Figure 2 is a photograph of an eatery named Tantalizer at Ile-Ife Nigeria which is a typical resemblance of the operation in virtually all the Tantalizer's eateries nationwide:

Figure 2: Tantalizer eatery at Opa area of Ile-Ife, Picture taken on July 15, 2015 @ about 3pm

Worship auditoria are not left out in this obnoxious attitude of loud sound production which is referred to (within the religious circle) as strong element of praise. Nigerians are a set of people with high consciousness and regard for spiritual obligations and this is the reason for the great numeric strength of church attendees in Nigeria presently. Then the concept of sound perception worship places is subjective. Loud sound is equally relative

because sound considered loud to one might not be loud to another. Cases have shown in several situations where a particular sound that has caused a discomfort to one has served as a tool for enjoyment to another. Sounds are perceived through hearing, hearing is achieved through the ear and the ear has a threshold of what sound it can accommodate. Any sound beyond what the threshold of human or animal ear con take is considered as noise. Emielu (2013)[8] asserts that "*Sound is considered noisy when it played at excessive volume with distortion of pure signals. It then becomes unpleasant to human ear. A major distinction between sound and noise is that sound is regarded as noise when it becomes a source of inconvenience to the conveniences of man and animal. Noise pollution is not unique or peculiar to developing countries alone; it is a common occurrence and of highest magnitude in most of the advanced countries" ~~(Emielu: 2013)~~*

However, as can be observed from the examples above, there is very little research if at all, on music and the environment in Africa. Yet, the threat of sound/noise pollution is currently on the increase in many African urban societies and the likely consequences on climate change and environmental is worth our academic attention. For many years as a church musician, my argument has always been on the need to adequately treat the acoustics of a worship auditorium in order to meet the evolving challenges of loud sound production. There is the need to take into consideration what wattage of sound can any room accommodates? Speakers systems are set up in the church without proper acoustic consideration.

[8] Emielu, Austin. 'Nigerian Highlife Music' Centre for Black and African Arts and Civilization. 2013, (pp. 45-56)

Sound Production, Transmission, Reception and the Environment

The branch of physics which deals with sound is known as acoustics which can therefore be defined as the science that studies sound production, transmission, reception and the effects of sound in a given space or channel. In simple terms, sound is thought of as movement of air caused by a vibrating body. Enendu asserts that "Sound is essentially, the movement of air in the form of pressure waves, radiating from a source and radiating in all directions"[9]. Three basic elements are needed to create sound: A vibrating body, a medium for the vibration to travel in and the resonating body who converts the vibration to a useable form. Vibrations are strong and gets weaker with from the source. The speed at which the vibration travels is known as the speed of sound and is dependent on atmospheric pressure. Generally, it can be taken as 340,29m/s. However, it is very rare to have a simple state of a vibrating body, a medium and a receiver because many things vibrate in our environment at the same time producing unwanted signals which we generally refer to as noise. Thus speaking of signal-to-noise-ratio; the ratio of wanted to the unwanted signal.

In all, sound waves once generated move through the air causing ripples and changes in air pressure which we perceive as sound. Sound waves are longitudinal waves just like ocean waves; creating crest and troughs (rising and falling waves) as they move through the air[10]. As such, there is a strong relationship between sound and atmospheric pressure or other climatic conditions basically as a result of latitudinal differences in temperature due to differential receipt of insolation which provide a partial explanation to differential in

[9] ibid

[10] Anderton, Craig. *Home Recording for Musicians.* New York: Amsco Publications. 1978 (pp. 8-10)

latitudinal pressure. This accounts for the differing behaviour of sound in various places and enclosures. Generally a sound wave is set in motion and is made to vibrate and are then transmitted usually through the air or atmosphere and received by the human ear.

The basic elements of sound include frequency (arising from the number of crest-trough combination per second), amplitude (loudness), and speed of travel as well as intensity (strength of signal). Music is generally referred to as organised sound that is pleasant to the ear while noise is defined as unorganised or unwanted sound that is unpleasant to the ear. However, it is important to point out that a very thin line exists between music and noise. Consequently music can easily become noisy when it is played into the threshold of pain; it then becomes unpleasant to the human ear.[11] Table 2 shows ~~The table below~~ reflects the different values of threshold of pain in human being as expressed by[12] [12] .

Table 2: ~~The examples of~~ sound pressure levels in relation to hearing threshold and pain Threshold (in dB SPL) ~~as stated~~

Threshold of pain	
SPL	Sound Pressure
120 dB SPL	20 Pa
130 dB SPL	63 Pa
120 dB SPL	20 Pa
134 dB SPL	100 Pa
137.5 dB SPL	150 Pa
140 dB SPL	200 Pa

Source: [12]

~~[11] Kadis Jay. The Science of Sound Recordings, Focal Press, Elsevier 225 Wyman Street, Waltham, MA 02451, USA, 2012. (pp. 27-28)~~

~~[12] Ibid~~

Music is considered noisy when it played at excessive volume with accompanying distortion of pure signals. It then becomes unpleasant to human ear. A major distinction between sound and noise is that sound is regarded as noise when it becomes a source of inconvenience to the conveniences of man and animal. Noise pollution is not unique or peculiar to developing countries alone; it is a common occurrence and of highest magnitude in most of the advanced countries. For instance, Kapoor and Singh assert that until the third century China used noise for torturing instead of hanging men for dangerous crime[13] [13] Similarly in India, until lately, noise considered grievous because traditionally, the remedy for noise pollution was a civil suit for a civil wrong just like any other serious crime[14] - [14].

Loudness as Power and the Domination of Space

Schaffer[15] [15] argues that "loudness relates to power". While this assertion may be true, it should be stressed here that the idea that loudness relates to power is not typically African even with the acoustic nature of our instruments as well as performance contexts and audience size. Rather, loudness as power and domination of space may be traceable to the West where the industrial revolution introduced not only electronic equipment with volume controls but most significantly, the technology of amplification and sound reinforcement which have come to define contemporary professional musical practice. Based on the effects of European incursion and eventual colonization[16]. African musicians and their audience have

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[13] Kapoor B S and Singh, K, "Noise the Insidious Killer", the Tribune of November 25, 1995. (pp.16)

[14] Nagi G.K, Dhillon M.K. and Dhlwal G.S. 'Noise Pollution. New Delhi: Common Wealth Publishers. 1999 (pp. 45-48)

[15] Schaffer A.H. Noise and its effects, Administrative Conference of the United States (1991) Retrieved from www.noise.liberary/suffer accessed on 14/06/2015.

[16] Emielu, Austin (2013) Nigerian Highlife Music, Centre for Black and African Arts and Civilization

inherited the technology of loudness as an essential aspect of contemporary musical performances.As Greene rightly observes “as Western sound technologies are drawn into music making around the world, their hard wirings begin to structure local musical practices in certain ways, imposing their musical logics on societies that adopt them. In this sense, “musicians have become not only producers of music but also significant consumers of technology”.[17] However, while industrial societies have evolved several laws to regulate loudness, most African nations do not have restrictive laws in this regard. Rather, for patrons, musicians and marketers, loudness remains connected to social status and power which supports schaffer’s theory. The end result of all this is the creation of a sound culture of loudness. Few examples are provided here to buttress the points.

In the late 1990s, Benson and Hedges Cigarette Company tagged one of their series of musical shows ‘Loud in Lagos. This show and many others which followed across Nigerian cities usually consisted of heavy wattage of sound generation which could be heard several kilometres from the venue of performance with the same frequency balance, amplitude and sound intensity. Since these pioneering efforts by Benson and Hedges, many other multi-national companies such as Nigerian Breweries, GLO, MTN, Airtel, Coca-Cola and Pepsi have resorted to using very loud music and popular musicians as brand-marketing strategies in their so-called ‘Road Shows’. Events such as ‘Star Trek’, ‘Glo Show’, Maltina and Malta Guinness ‘Street Dance’ among several others, have become important events that involve heavy wattage of music and sound reinforcement as well as gaseous emissions from trucks that transport equipment, generating sets and possibly radiations from electronic/ICT equipment used. These phenomena of course, have their implications on the environment

[17] Thèberge, Paul. Any Sound you can imagine: Making Music /Consuming Technology. Middletown Connecticut: Wesleyan University Press. 1997. (pp. 56-59)

either in the short or long run.It is the contention of this paper that as more and more companies and organizations join this bandwagon in what may be described in advertising terms as a 'war of brands', the music will keep on getting louder, if only to enforce and re-enforce brand supremacy and command brand loyalty. While it has been argued above that loudness takes up social gatherings and activities, there is no mention of atmospheric space which sound occupies. Because sound travels through the air and is also conditioned by atmospheric pressure, it stands to reason that at certain sound pressure levels (SPL) which is even higher than the threshold of pain, the atmosphere may be saturated with loud sound and over time could lead to pollution and environmental degradation with resultant effects on human state of health. According to research published in *Environmental Health Perspectives*, long-term exposure to traffic noise may account for approximately 3 percent of coronary heart disease deaths (or about 210,000 deaths) in Europe each year. One of the key ways is by elevating stress hormones such as cortisol, adrenaline, and noradrenaline, which, over time, can lead to high blood pressure, stroke and heart failure.[18] One review of research showed that "arousal associated with night-time noise exposure increased blood and saliva concentrations of these hormones even during sleep.[19] Noise pollution can harm human health in many ways, aside from heart ill-health and leading to hearing loss. Many of these are just beginning to be explored. For instance, a study on pregnant women by[20] found that exposure to noise pollution may lead to lower birth weight.

[18] Jones. D.M. Chapman A.J. & Auburn T.C.(1981) "Noise in the Environment: Social Perspectives". www.medscape.com/viewarticle accessed on June 4, 2015
[19] Greene, D. Paul and Porcello, Thomas(2014). *Wired for Sound: Engineering and Technologies in Sonic Cultures.* Middletown Connecticut: Wesleyan University Press.
[20] Ibid

Nagata[21] in his discussion was of the view that 'loudness' syndrome has encroached into religious worship centres with heavy wattage of sound blaring from Hi-fi equipment in churches especially the modern Pentecostal churches since the 1990s. There seems to be also a 'war' of sounds in churches today to win more converts or show superiority over their 'less endowed' colleagues without considering audience size and other implications for architectural and environmental acoustics. In some of the church services attended as part of data collection for this research, it was found out that any attempt to reduce the volume of music or the preacher's microphone , was met with vehement resistance and sometimes open confrontation between the sound engineer and the pastor or musicians.

Moving away from the corporate arena, musicians and their patrons have also resorted to a war of supremacy through sound amplitude and intensity. In Nigeria and in Ghana for example, people are attracted to the venue of social ceremonies more by loud noise/music than by invitation cards; the louder the music, the more successful the ceremony. It is also a common practice for celebrants to show their affluence on such occasions by inviting many musical groups to perform. Commenting on the use of sound for social gathering and party celebration, the case of funeral ceremony attended in Benin City in 2005 and recently in Ile-Ife in 2016 which had five and eight live bands respectively playing simultaneously; each child of the deceased hired his/her own band. In such a situation for example, loudness or amplitude became a selling-point for the musician and also a sign of supremacy over his 'less fortunate' siblings. This action of multi-musicians performing at and for a particular occasion as orchestrated by show of class syndrome was a reflection of our level of the dangers acquired through loud sound assimilation. ~~The~~ Figures 3 & 4 ~~below~~ further expresses the speaker set up of a typical popular musician's band stand in Nigeria:

~~[21] Nagata, O. (2011) Church Acoustics. Nagata Acoustics News, Vol. 01-9, No. 165~~

Figure 3: The speaker system of a band at a social function (picture taken by the researcher on July 4, 2015)

Figure 4: The speaker system of a band at a social function (picture taken by the researcher on July 25, 2015)

As a result of ignorance of the dangers of loud sound on human health, Nigerians appreciate loud music, especially under the influence of alcohol; this gives strength to the celebrant and guests alike. This is also an avenue to display wealth affluence as a tool for the

oppression of the less privileged. The picture of a man in his late sixties (60s) who was not satisfied with the sound output moved closer to the front of the speaker to dance. (See Figure 5)

Figure 5: Ignorant Nigerian dancing out his health at a social gathering in Ile-Ife. (Picture taken May 27, 2015)

Use of Headphones as Sound Facilitator

Variety of sound systems is to be found in the variety of amplification systems in form of headphones and earphones that come in all shapes and sizes of headphones and earphones. These devices are used improperly as they can cause permanent hearing loss. Hearing is a complex sense involving both the ear's ability to detect sounds and the brain's ability to interpret those sounds, including musical sounds and the sounds of speech[22]. Exposure to noise pollution, especially for younger people, has gone from huge boom boxes

[22] Oishi and Schacht, J (2011). "Emerging treatments for noise-induced hearing loss". *Expert opinion on emerging drugs* 16 (2): 235–45.

and car stereo speakers to sound delivered directly into the ear through headphones or earphones.

Hearing specialist Schessel[23] commented that headphones and earphones appear to be the most damaging. Because noise-induced hearing loss is a result of intensity (loudness) and duration of exposure, Schessel writes that:*'these devices may be capable of inducing a permanent bilateral sensor neural hearing loss especially if they are used at a volume setting of four or above for extended periods'*[23] ~~(Schessel: 1992)~~

The use of headphone is becoming most popular among Nigerians especially, youths between the teen ages and early adulthood ,however, this practice is also found among adults. Many Nigerians are not conscious of the danger inherent in regular use of headphones or earphones. This action is probably a result of ignorance of the effects or probably enjoys loud sound and ignores or defiles warnings on the dangers at the expense. The relevance of the Figure 7 (a-e) ~~below~~ is to showcase the existence of various types of headphones and earphones and to reflect the ignorance of most Nigerians in the culture of the use of headphone.

Figure 6 (a-~~d~~): *Various existing headphones and earphones*

~~[23] Schessel DA,. Recurrence rates of acoustic neuronal in hearing preservation surgery. *Am J Otol* 1992; 13:233-5.~~

a 

b 

c 

d 

e 

Figure e: A Nigerian listening to music with the aid of an earphone

Some studies have found somewhat increased risks for temporary hearing damage from listening to music during strenuous exercise, compared to when listening at rest. Some

Finland researchers consisting of Airo et al[24] recommended that exercisers should set their headphone volumes to half of their normal loudness and only use them for half an hour. With modern technology on the production of noise cancelling headphones which are so effective that a person may not be able to hear oncoming traffic or pay attention to people around him/her. This was considered as a general danger that music in headphones can distract the listener and lead to dangerous situations[25].

Sound Pressure and Measurement Level

The minimum acoustic pressure audible to the young human ear judged to be in good health is approximately 20 × 10^{-6} Pa. The minimum audible level called the threshold of hearing. For the normal human ear, pain is experienced at sound pressures of the order of 60 Pa, this level is the threshold of pain. The Bel which is the logarithm of the ratio of two quantities, one of which is a reference quantity is employed in the sound measurement: to avoid a scale which is too compressed over the sensitivity range of the ear, the decibel is introduced. The sound pressure level (SPL), in decibels (dB); which is often measured with a sound level meter, is obtained from this equation: SPL (dB) 10log (r2ms *r2ef).?? Not properly written*

The equivalent noise level using A-weighting was taken every fifteen minutes in each location between 6:00 am and 12:00 pm and the LAeq, T of each market center was calculated. Figure 3 is the graphical expression of findings of noise level in selected market centres in Ile-Ife.

[24] Airo, Erkko; J. Pekkarinen; P. Olkinuora. (1996) "Listening to music with earphones: an assessment of noise exposure," *Acustica- Acta Acustica*, pp. 82, 885- 894.

[25] lbld

~~Figure 3: Sound Pressure Level of selected market centers in Ile-Ife~~

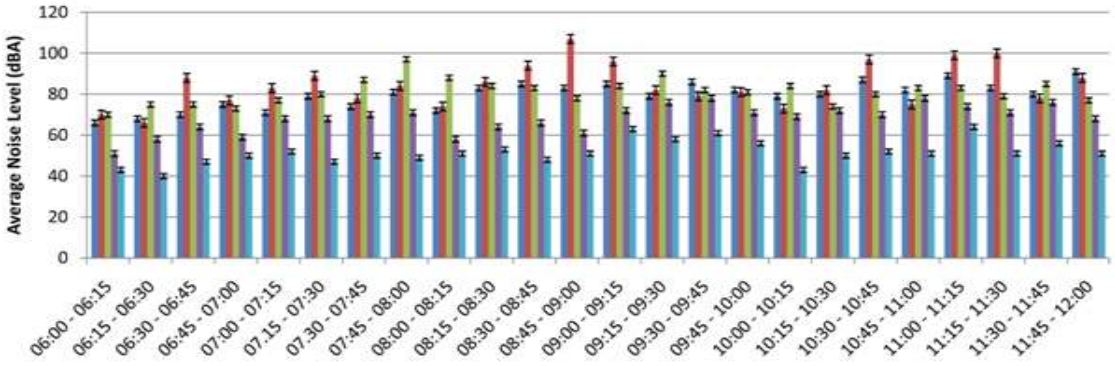

Figure 3: Sound Pressure Level of selected market centers in Ile-Ife

The Way Forward

In Nigeria, the problem of noise pollution is wide spread. Several studies report that noise level in metropolitan cities exceeds specified standard limits. A study by Ugwuanyi[26] conducted in Makurdi, Nigeria found that the noise pollution level in the city was about 3 – 10 dB(A)~~dB(A) to 10 dB(A)~~ above the recommended upper limit of 82 dB(A). Anomohanran (2008) also found that the peak noise level at road junction in Abraka, Nigeria to be 100 dB (A). This noise level is higher than the recommended level of 60 dB (A) for commercial and residential areas. Ighoroje[27] investigated the level of noise pollution in selected industrial locations in Benin City, Nigeria. The average ambient noise level in Sawmills, Electro-

~~[26] Ugwuanyi J.U, Ahemen.I and Agbendeh A.A, "Assessment of Environmental Noise Pollution in Markurdi Metropolis, Nigeria", J. Pure Appl. Sci. 6(2), 134-138, 2004.~~
~~[27] Ighoroje A.D.A, Marchie. C and Nwobodo E.D, (2004) "Noise Induced Hearing Impairment as an Occupational Risk Factor among Nigerian Traders", Nigeria J. of Physiological Sciences 9(1-2), 14-19.~~

acoustic market and food processing industrial areas was measured to be above 90 dB (A). This noise level is well above the healthy noise level of 60 dB (A).

While many African nations have embraced the idea of environmental management which has necessitated the setting up of a number of national and regional environmental agencies, they are yet to embrace the idea of noise control as an integral part of the framework of policies on environmental protection. In the United States of America for example, out of about 32 environmental laws, provision is made for noise control. The US noise control act of 1972 establishes a national policy to promote an environment for all Americans from noise that jeopardise their health and welfare. The United Kingdom too, has environmental laws including legislation on noise. Of great significance is the formation of ~~The~~ the Noise Abatement Society in the U.K. established by John Connell (O.B.E.). In 1960, he successfully lobbied the noise abatement act through parliament, establishing for the first time in the U.K. that noise is taken as a statutory nuisance. Over the years, the society has been involved in creating awareness and education about sound and the use of sound. Due to the ignorance of Nigerians on the fact that there exist a close nexus between noise pollution and sustainable city, little or no attention is paid to the control of noise pollution in Nigeria. The execution and implementation of the law as regards environmental pollution is never implemented to the letter. It is observed that the persistence of this problem could endanger the future stability of human health and could aggravate the human health ~~catastrophe~~ in the fast growing cities in Nigeria.

The first approach and effective measure of abating noise pollution is to control through heavy taxation on the so called celebrants and the band, not only this, a minimum volume level of sound production in the public should be prescribed in order to maintain a

particular sound volume which will commensurate with the ideal sound level expected though, this measurement of an ideal sound level is equally subjective..

Secondly, use of Combination of Barriers as Noise barriers is among the most common alleviative measures used. They are most effective if they break the line of sight between the noise source and the receptors being protected, and if they are thick enough to absorb or reflect the noise received. Various materials and barrier facade patterns have been extensively tested to provide maximum reflection, absorption, or dispersion of noise without being aesthetically ugly. According to Mehravaran[28], if the line of sight between receiver and highways is blocked with barriers, the 5 dB attenuation can be expected. Then, adding 1 metre to the barrier height provides the additional 1.5 dB attenuation. Length of barriers should be long enough, to diffract only small portion of noise through the edge of the barriers. Barriers should be so long that the distance between receiver and barrier end in at least four times of the perpendicular distance between receiver and barrier.

Conclusion and Recommendations

This study has drawn attention to an important and emerging area of discourse on arts and the environment and the role of professional music practice and climate change. The paper observes that while some attention is currently being paid to music and climate change, the issue of loud music and noise pollution from such occurrences have been ignored. Our societies, especially in Africa, are becoming very noisy in the name of musicality and over time, this may constitute environmental hazards through distortions in atmospheric pressure. Although establishing a direct relationship between noise/music and climate change will

[28] Mehravaran, Zabani, Nabi, and Ghousi, R and Keshavarzi Shirazi, H (2011), 'Noise Pollution Evaluation Method for Identification of the Critical Zones in Tehran', Int. J. Environ. Res., 5(1):233-240,

require a multi-disciplinary research over several years and in several climatic and cultural zones, this paper concludes that loud music and noise are subtle agents of environmental degradation. It also submits that electrical/electronic equipment used for sound production and re-enforcement could also cause environmental hazards through some forms of radiations and gaseous emissions. Owing to the increasing noise levels occasioned by very loud music and other agents in African cities, the time has come to begin legislation on noise control. This paper recommends that acceptable optimal standards of sound production either in enclosures or in open spaces should be established for effective sound control. More importantly, a lot of awareness and advocacy should be carried out in order to sensitize the citizenry on the dangers of very loud music which most times translate to noise. Finally, the paper recommends that sound/noise pollution should form part of the environmental policies of African nations.

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