

Original Research Article

**‘For the Love of the Environment’
Reflections on Professional Music Practice and Climate Change in Nigeria**

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ABSTRACT

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

Study design: ~~The design of this study examinesis 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 observation of music production at social events and public places, interviews with music professionals and audiences. ~~The study was also done~~ using a Virtual Instrument; a Sound Pressure Level mobile application installed on a mobile phone for sound production measurement. 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 research’s case study ~~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 findings of this paper reflects that the~~ 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 ~~on~~ the acoustic-environment more ecologically-friendly.

Conclusion: This paper recommends that acceptable optimal standards for 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: music and sound, environmental degradation, sound and climate change

~~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 ~~organized~~~~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 ~~the band~~~~we~~ continued to play, there were yet, more calls for reduction of ~~the~~ sound pressure and volume levels until ~~the performance~~~~we were~~ practically ~~turned to~~ singing and playing in soft whispers before ~~being~~~~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. ~~The complaints about the high volume of the sound~~~~if~~ ~~complain~~ made very little sense to ~~the band~~~~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*’ which occurs when Sound Pressure Level (SPL) becomes unbearable for a human listener, ‘*listeners’ fatigue*’ which is a feeling of tiredness or an unconscious switch to tuning the audio out or to passive listening, ‘*frequency bias*’ (which expresses the value in megawatts per 0.1 Hertz (MW/0.1 Hz_[MR1]), ~~at the same time approximates the Balancing Authority Area’s response to Interconnection frequency error (as defined in the NERC Glossary)~~, ‘*grating*’, which describes the nature of sound as harsh and unpleasant, ~~is a skeletal structure designed to support or enclose an object, 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*, a vibration produced in one body by the vibrations of exactly the same period in a neighboring body, ‘the decibel scale’ which is used to measure sound level etc, 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 on the dangers of loud sound on human health from the Ear, Nose and Throat (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 the impacts ~~ir~~ 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 when it has become to being a global concern. There are many different problems that are leading to climate change in Nigeria due to natural events and human musical activity_[MR2].

Nigeria is experiencing adverse climate conditions with negative impacts on the welfare of millions of people. Persistent droughts and flooding, off season rains and dry spells have sent growing seasons out of orbit, on a country dependent on a rain fed agriculture. Alarm bells are ringing with lakes drying up and a reduction in river flow in the arid and semi arid region which has resulted in fewer water supplies for use in agriculture, hydro power generation and other uses. The main suspect for all this havoc is Climate Change. The Intergovernmental Panel on Climate Change (IPCC){1} and major scientific organizations of industrialized countries, as a result of several studies, have concluded that the increase in global temperature since the middle of twentieth century has been due mainly to human induced (anthropogenic) greenhouse gases concentration via the green house effect; while the warming effect of natural phenomenon such as solar variation contributed a small warming effect from preindustrial times to 1950, and from then a reverse cooling effect. The United Nations Framework on Climate Change (UNFCCC){2-3} uses the term “Climate Change” for human induced change while the term “Climate Variability” is used for changes due to External Forcing. External forcing is climate change caused by change in the global energy balance owing to fluctuations in the Earth’s orbit, ocean circulation and atmospheric composition. 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 going all around the world, Ighoroje{4} stated that 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 their theories. Issues on loud—Loud music production as a global-warming pollution into the

environment in Nigeria and Africa in general, especially with our hot atmospheric condition, calls for a serious debate. Global warming produces increase in global temperature which impacts directly on human life and the natural environment. Increasing global temperature is having serious effects and consequences for the world, including rising sea levels, changes in climate patterns, change in the amount and pattern of precipitation, and more severe weather including stronger tropical storms, droughts, and heat waves, likely including an expanse of the subtropical desert regions. Other indicators of global warming include Arctic shrinkage and resulting Arctic methane release, shrinkage of the world's rainforest (already very damaged by deforestation from logging and farming), increases in the intensity of extreme weather events, changes in agricultural yields, glacier retreat, species extinctions and changes in the ranges of disease vectors. The recent natural disasters caused by tropical cyclones, hurricane; flooding in Bangkok Thailand, Australia and India; sea level rise, heat waves in Europe, coastal erosion and flooding due to high precipitations are attributable to global warming and associated extreme weather conditions. In the Sub-Saharan Africa, there had been persistent drought and desertification in recent years {5}~~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 as submitted by Al Gore were correct. Humans are almost always the cause {6}. In a contrary argument, John R. Christy {7-9} widely publicized consensus reports that 'thousands' of scientists are misrepresentatives of climate science, containing overstated confidence in their assertions of high climate sensitivity. Climate models overestimate the response of temperature to greenhouse gas increases. Also shown was a lack of evidence to blame humans for an increase in extreme events. The argument positioned that it is wrong to convict Carbon dioxide (CO₂) of causing any of these

events, because they've happened in the past before Carbon dioxide (CO2) levels rose. It was argued that it is a simple fact that CO2 is plant food and the world around us evolved when levels of CO2 were five to ten times what they are today {9}.~~were correct. I'm now going a step further: Humans are almost the cause.~~"[†]

Zannin (10) stated the following in his Senate Environment and Public Works Committee testimony "Natural[MR4] Resource Adaptation: Protecting Ecosystems and Economies that there is no scientific proof that human emissions of carbon dioxide (CO2) are the dominant cause of the minor warming of the Earth's atmosphere over the past 100 years. If there were such a proof it would be written down for all to see. No actual proof, as it is understood in science exists[MR5]. As a way to foreground this discussion, as a way to foreground this discussion[MR6], it is important to present the decibel scale which attempts to capture the volume of sound from various sources in modern societies and specifically in Ile-ife. However, to arrive at the results as seen in table 1, a noise integrating dosimeter was attached to the employee's belt or waistband and a small microphone connected to the dosimeter by a thin microphone cord, was fastened to the body on the top of the shoulder at a point midway between the ear and outside of the shoulder. For[MR7][MR8] the measurements, a windscreen was placed over the microphone to reduce or eliminate wind noise or artifact noise, which can occur if objects bump against an unprotected microphone. Dosimeters were typically set up to collect noise measurement data using three different settings for integrating noise to allow comparison of noise measurement results with the three different noise exposure limits referenced in most HHE reports, the OSHA Permissible Exposure Limit, OSHA Action Level, and the NIOSH Recommended Exposure Limit. During noise dosimetry

[†]Environ Health Perspectives; 2007Environ Health Perspectives. 2007 November; 115(11): A536-A537.)

measurements, noise levels below the threshold level were not integrated by the dosimeter for accumulation of dose and calculation of time-weighted average noise level. The dosimeters averaged noise at a rate ranging from one second to sixty seconds. (See Table1)

~~As a way to foreground this discussion, I will let you in on the decibel scale which attempts to capture the volume of sound from various sources in modern societies.~~

Table 1.The Decibel Scale and& 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 {11}²

Source {12}³

The noise sources as listed in Table 1 are typical of a-Western society. 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 working 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 exists momentarily, musical shows may last for several hours which translates 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

²~~Encarta Premium Dictionary, 2009~~

³~~Data Collection on Ife-Ife residents~~

professionals, government agencies and music consumers in Africa have come to accept loudness as a way of life. ~~The paper then examine 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~~

~~Enendu {13} stated that although~~ 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, ~~Weber et al {14} stated that~~ 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 ~~organized~~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.~~ death⁴.

~~Energy, climate change and impact of different music delivery methods~~ ~~were~~was the focus of a study by Weber et al ~~{15}. This:~~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. Several issues have been raised on the subject of noise pollution as a related area of

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)~~

~~loud music production. 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 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’’ [{16}](#)⁶

calling on the executive governor of Lagos to embark a public enlightenment campaign to ~~sensitizes~~^{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 [{17}](#).⁷ Noise is our enemy.

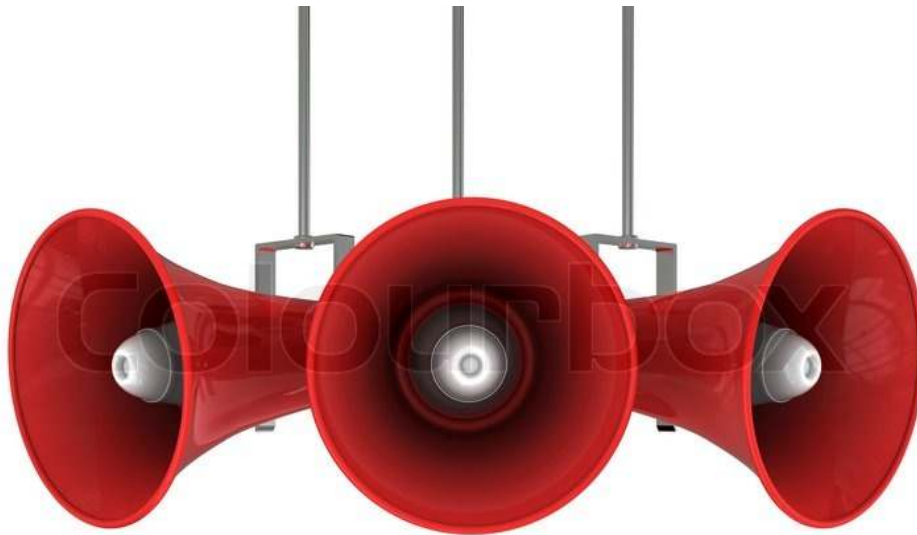
It is not only a loud enemy of our ears; it is also an enemy to the environment as it pollutes our surroundings. Constant exposure to loud noise [according to Cai Q et al, {18}](#), ~~experts say,~~ affects our auditory system; especially when it is above the normal 85 decibels (dBs). Noise

⁶~~.www.vanguardngr accessed on July 24, 2015~~

⁷~~.www.thenationonline accessed October 7, 2015~~

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:

Figure 1 Typical sample of Horn speakers used in most churches and mosques in Nigeria



Music. ~~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 as asserted by Holdren {19} :-

—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. Further observation was made by Finegold {20} that the risk of death from any cause was increased by 4% in areas with noise level over 60 decibels when compared to quieter areas. The argument further stated that Risk of death from ischemic heart disease was also increased by 3% in adults and 4% in the elderly in areas with daytime noise levels of 55-60 decibels, when compared to areas with noise levels fewer than 55 decibels. In another study, it was also reported by Emielu by-{21} that the incidence of hearing loss in the United States is approaching epidemic proportions. According to this study, a staggering one in three Americans now suffers some degree of hearing impairment, much of it is noise induced. Visits to some of these places have indicated that just at the entrance, you will be welcomed by loud sound of more than 100dB~~100Db~~ 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, 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 ~~realize~~realise the dangers caused on the inhabitants of these areas where such eatery is located. Figure 2 is a photograph of an eatery named Tantalizer at Ile-Ife Nigeria with display of speaker system for sound amplification, which is a typical resemblance of the ~~Tantalizer 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 can take is considered as noise. Emielu {22}(2013)⁸ asserts that

⁸Emielu, Austin. 'Nigerian Highlife Music' Centre for Black and African Arts and

“Sound is considered noisy when it is 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. Nigerians live in a noisy environment and this is due to several human activities made through traffic, machineries and electronics which are barrages of sound. It was argued by Oyedepo {23} that almost everyone has had one experience of being temporarily "deafened" by a loud noise. This "deafness" ~~isn~~ not permanent, although it is often accompanied by a ringing in the ears, and one can hear another person if he raises his voice. Likewise, normal hearing comes back within a few hours at most. This sort of partial hearing loss is called Temporary Threshold Shift (TTS). 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~~ can accommodate?accommodates? Speakers systems are set up in the church without proper acoustic consideration.

Sound Production, Transmission, Reception and the Environment

—Civilization. 2013, (pp. 45-56)

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. [Anderton {24}](#)~~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, [according to Kadis {25}](#) 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 provides a partial explanation to ~~differences~~^{differential} in latitudinal pressure ~~and also. This~~ accounts for the

⁹~~ibid~~

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

differing behaviour of sound in various places and enclosures. Generally a sound wave is set in motion and is made to vibrate and ~~isare~~ 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 ~~organized~~~~organised~~ sound that is pleasant to the ear while noise is defined as ~~unorganized~~~~unorganised~~ or unwanted sound that is unpleasant to the ear. However, ~~Nagi {26} argued that~~ 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.⁺¹

~~The table below reflects the different values of threshold of pain in human being as expressed by⁺².~~

~~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 |

⁺¹ ~~Kadis Jay. The Science of Sound Recordings, Focal Press, Elsevier 225 Wyman Street, Waltham, MA 02451, USA, 2012. (pp. 27-28)~~

⁺² ~~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 ^[27] assert that until the third century China used noise for torturing instead of hanging men for dangerous crime.¹³ Similarly in India, until lately, noise considered grievous because traditionally, the remedy for noise pollution was a civil suit for a civil ~~offence~~^{wrong} just like any other serious crime.¹⁴

Loudness as Power and the Domination of Space

Schaffer ^[28] ~~argued~~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; ~~given 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.~~ ~~Based~~ on the effects of European incursion and eventual ~~colonization.~~^{colonization}¹⁶.

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.library/suffer accessed on 14/06/2015.

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

African musicians and their audience have inherited the *technology of loudness* as an essential aspect of contemporary musical performances. As Greene {29} 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, Thèrberge {30} stated that “musicians have become not only producers of music but also significant consumers of ~~technology~~ *technology*”.⁴⁷ 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 ~~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*’. ~~Lagos~~. This show and many others which followed across Nigerian cities usually consisted of heavy wattage of sound generation which could be heard several ~~kilometers~~ *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

—Civilization

⁴⁷Thèrberge, Paul. *Any Sound you can imagine: Making Music /Consuming Technology*. Middletown Connecticut: Wesleyan University Press. 1997. (pp. 56-59)

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 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* [{31}](#), 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. [In professing a solution to heart disease death, Jones {32} suggested that one-~~One~~](#) of the key ways is by [elevating/lowering???](#) stress hormones such as cortisol, adrenaline, and noradrenaline, which, over time, can lead to high blood pressure, stroke and heart failure.⁴⁸ One review of research [by Gehring et al {33-34}](#) showed that “arousal associated with night-time noise exposure increased blood and saliva concentrations of these hormones even during sleep.”⁴⁹ 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

⁴⁸ 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

⁴⁹ Greene, D. Paul and Porcello, Thomas(2014). *Wired for Sound: Engineering and Technologies in Sonic Cultures*. Middletown Connecticut: Wesleyan University Press.

on pregnant women by [Green {35}](#)²⁰– found that exposure to noise pollution may lead to lower birth weight.

Nagata [{36}](#)²¹ in his discussion ~~argued~~~~was of the view~~ that ‘loudness’ syndrome has encroached into religious worship ~~center~~~~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 ~~through more by~~ loud noise/music ~~rather~~ than by invitation cards; the louder the music ~~in a social gathering,~~ the more successful ~~is such~~~~the~~ ceremony. It is also a common practice for celebrants to show their affluence on such occasions by inviting many musical groups to perform ~~in a singular social gathering. Buttressing the claim, Commenting~~ on the use of sound for social gathering and party celebration ~~was,~~ 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 ~~at maximum volume level to determine whose sound is the loudest,; each child of the deceased hired his/her own band.~~ In such a situation for example, loudness or

²⁰ ~~Ibid~~

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

amplitude became a selling-point for the musician and also a sign of supremacy over one another.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 Nigerian's ignorance on our level of the health 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:



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

Due to



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 4)

5)



Figure 4:5: Ignorant Nigerian dancing out his health at a social gathering in Ile-Ife. (Picture taken May 27, 2015^[MR9])

Use of Headphones as Sound Facilitator

A 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. According to Oishi {37} '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 speech²²'. Exposure to noise pollution, especially for younger people, has gone from huge boom boxes and car stereo speakers to sound delivered directly into the ear through headphones or earphones.

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

Hearing specialist Schessel {38-39}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' (Schessel: 1992).

Schessel {39} further stressed to consider ~~on~~ some loudness/time facts ~~to consider~~ using decibel as a unit of measurement that:

aAt 95 dB, damage will occur after four hours of exposure per day.;
aAt 100 dB, damage will occur after two hours of exposure per day.;
aAt 105 dB, damage will occur after one hour of exposure per da.;
aAt 110 dB, damage will occur after 30 minutes of exposure per day.;
aAt 115 dB, damage will occur after 15 minutes of exposure per day.;
aAt 120-plus dB, damage occurs almost immediately'.

The use of headphones_s is becoming most popular among Nigerians especially, youths between the teen ages and early adulthood. ~~This however, this~~ practice, ~~however,~~ is also found among adults. Many Nigerians are not conscious of the danger inherent in regular use of headphones or earphones ~~which. This action~~ is probably ~~as~~ result of ignorance of the effects ~~of the use of earphones. They of or~~ probably enjoys loud sound and ignore ~~medicals or defiles~~ warnings on the dangers ~~and effects these practices have on their health. Figure 5 (a-b)at the expense. The relevance of the figure 7 (a e) below illustrates is to presentshowcase~~ the existing various types of headphones and earphones and to reflect the ignorance of most Nigerians in the culture of the use of headphone.

Figure 57 (a & b): Two types of the ~~d~~: Various existing headphones and earphones commonly used by youths and adults in Nigeria

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



(a)



(b)



b

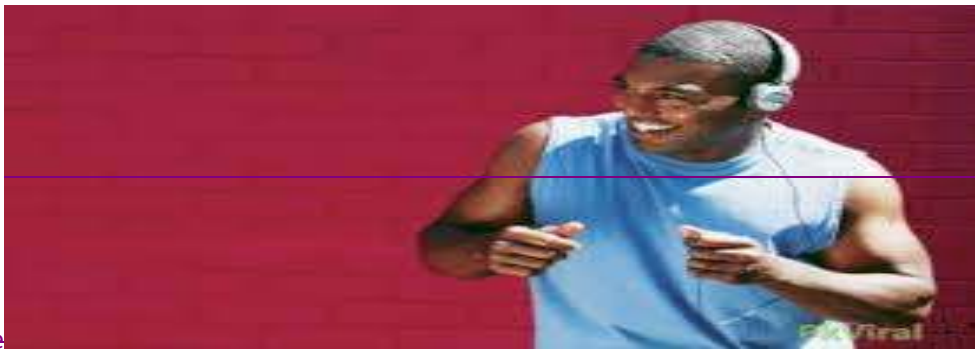


Figure e: A Nigerian listening to music with the aid of an earphone

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 Finnish Finland researchers, such as consisting of Airo et al {40-41}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 foron 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 environmental factors has put many Nigerians in an untimely death. Airopeople around him/her. This was considered this as one of the a-general dangers of loud

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

that music in, or from headphones application cause on distract users listener and can lead to dangerous health situations^{[MR10] {41}}²⁵;

Sound Pressure and Measurement Level

Senturia {42-43} stated that the minimum acoustic pressure audible to the young human ear judged to be in good health is approximately 20×10^{-6} Pa, the 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; Pa, this level is the *threshold of pain* {43}. 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)

$$\text{SPL (Db)} = 10 \log \left(\frac{P_{\text{rms}}^2}{P_{\text{ref}}^2} \right) \quad (2)$$

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 $L_{\text{Aeq},T}$ of each market center was calculated using Figure 3 is the graphical expression of parameters below: (See Table 2) findings of noise level in selected market centres in Ile-Ife.

Table 2: The setting of parameters used for measurement for the study

| Settings of parameters used for measurement | |
|---|----------|
| Parameters | Settings |
| Meter fall-off speed | 100 ms |
| Average interval between measurement | 1 s |

²⁵ Ibid

| | |
|-------------------------------|------------------|
| <u>Sampling rate</u> | <u>High</u> |
| <u>Weighting</u> | <u>A</u> |
| <u>Automatic Gain Control</u> | <u>By-passed</u> |
| <u>Microphone</u> | <u>Enabled</u> |

Method of Data Collection

The application was launched on the phone in a quiet office and in a room in a quiet residential area for the purpose of calibration. The period of measurement was divided into three sections: 6:00 to 12:00, 12:00 to 18:00 and 18:00 to 21:00. Readings of average noise level were taken every fifteen minutes with the mobile phone held at ear level in each of the locations.

Discussion

Average noise level in the three major Markets in the city ranged from 93.33 to 105 dBA, 89.65 to 97.30 dBA and 89.89 to 92.3 dBA during the morning hours (6:00-12:00), afternoon hours (12:00-18:00) and evening hours (18:00-21:00) respectively. Noise in the markets is mostly from horns of vehicles, sound from loudspeakers of hawkers of different kinds of goods and noise from conversation between people. As a result of the high level of background noise, traders have to shout to make themselves heard by customers. This accounts for the high level of equivalent noise level in the markets from morning till evening (6:00 to 18:00) compared to the residential areas as shown in Table 1. The average noise level in the three residential areas under study in the city ranged from 81.75 to 96.04 dBA, 75.1 to 89.65 dBA and 85.71 to 98.09 dBA during the morning hours, afternoon hours and evening hours respectively. The noise level is higher at Ijigbo roundabout compared to other residential areas because it is at the heart of the city. Noise in this location, is caused by vehicles and commercial activities.

Table 3 Provide a short title or some explanation for both tables.

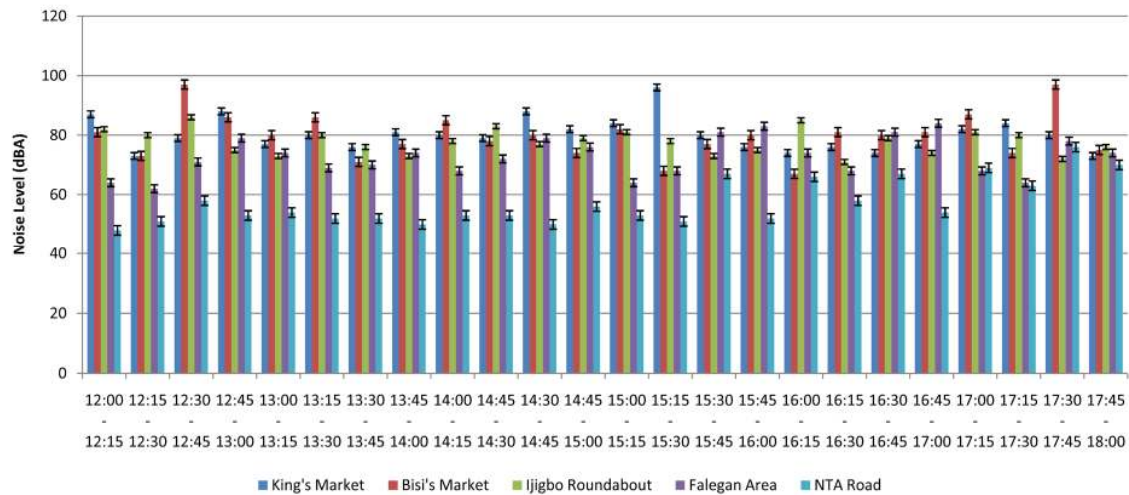
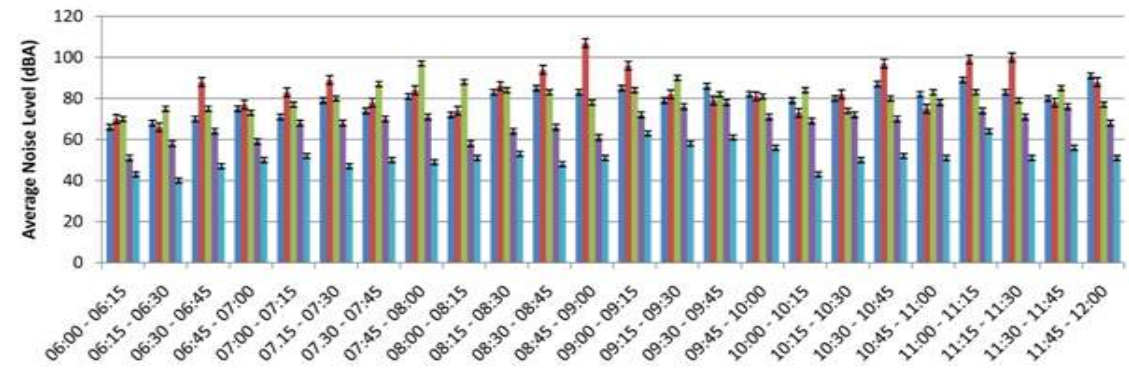
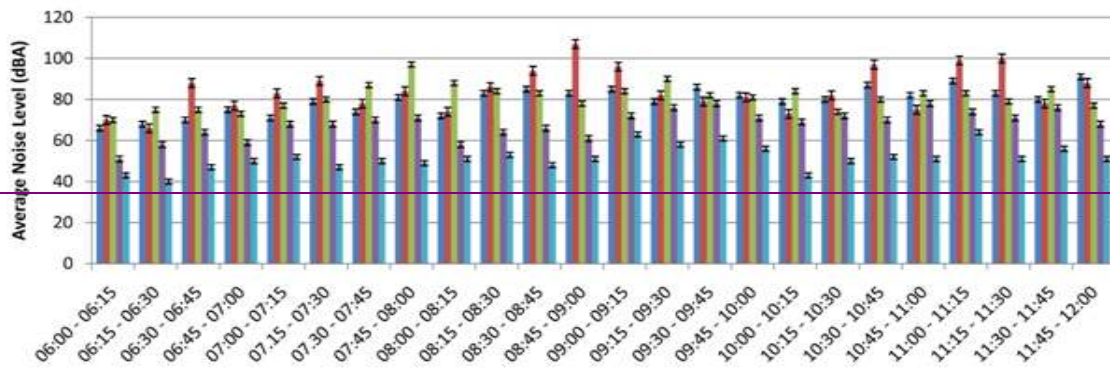


Table 4



The relevance of the above two tables is to show how Nigerians are daily exposed to noise level of between 75 -98 Db or more.

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



The Way Forward

~~The problems in Nigeria, the problem~~ of noise pollution ~~in Nigeria are~~ wide-spread. Several studies ~~report have~~ shown that noise levels in metropolitan cities exceed specified standard limits. A study by Ugwuanyi ~~et al {44}~~²⁶ conducted ~~a research~~ in Makurdi, Nigeria found that the noise pollution level in the city was about 3 dB(A) to 10 dB(A) above the recommended upper limit of 82 dB(A). Anomohanran ~~{45}(2008)~~ also found that the peak noise level at road junction in Abraka, Nigeria to be 100 dB (A) ~~Ochuko {46}) states that, this. This~~ noise level is higher than the recommended level of 60 dB (A) for commercial and residential areas. ~~Ochuko {46-48} Ighoroje~~²⁷ investigated the level of noise pollution in selected industrial locations in Benin City, Nigeria. The average ambient noise level in Sawmills, Electro-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).~~

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.

While many African nations have embraced the idea of environmental management which has necessitated the setting up of a number national and regional environmental agency, 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 {47} of 1972 establishes a national policy to promote an environment for all Americans from noise that jeopardize their health and welfare. The United Kingdom too, has environmental laws including legislation on noise {48}. Of great significance is the formation of —The Noise Abatement Society in the U.K. established by John Connell. Georgiandou {49} accounted that in (O.B.E.). In 1960, Connell 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. Cohen {50} however submitted that 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 about the existing 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 effectively 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. Moreover, a maximum 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, the useUse of a combinationCombination of barriersBarriers as noiseNoise 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 Mehravaran²⁸, 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 which reveals that the sound/noise levels of professional musical practices measured at the different locations of social gathering and market places exceeded the recommended limit of 60 dBA. This study has been able to show that noise levels in the selected locations are generally high; this poses a severe health risk to the residents. Furthermore, discomfort and irritation being caused by the pollution can drastically reduce productivity, both in public service and private sectors. In addition, some areas as a result of excessive loud sound production may soon reach the threshold of pains and lead to permanent loss of hearing and may advance death. A

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,

number of action plans can be taken to abate the environmental noise pollution in Nigeria. People are not expected to spend more than two hours at social gatherings and not more four hours per day in the markets; those whose major sources of income involve selling in these markets may consider the use of ear protective devices. Awareness about harmful effects of loud music/ noise among people is very low, hence the generation and exposure to excessive noise.

~~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 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. It is recommended~~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, it is recommended~~the paper recommends~~ that sound/noise pollution should form part of the environmental policies of African nations.

References

1. Intergovernmental Panel IPCC-xx/doc. 2 on climate change Twentieth session agenda item: 2 Paris, February 2003. Pg.19-21
2. Assessing the Costs of Adaptation to Climate Change: A Review of the NUFCCC and Other Recent Estimates, August, 2009. Pg. 63-65

3. Assessing the Costs of Adaptation to Climate Change: A Review of the NUFCCC and Other Recent Estimates, August, 2009. Pg. 63-65
4. Ighoroje, A.D.A., Marchie, C. and Nwobodo, E.D. (2004) Noise Induced Hearing Impairment as an Occupational Risk Factor among Nigerian Traders. *Nigerian Journal of Physiological Sciences*, 9, 14
5. http://en.wikipedia.org/wiki/global_warming accessed March 26, 2016
6. www.google.com/comments/Al Gore/climatechange accessed February 16, 2016
7. [www.epw.senate.gov/US Senate Environment and Public Works Committee](http://www.epw.senate.gov/US_Senate_Environment_and_Public_Works_Committee) accessed February 2016
8. [www.epw.senate.gov/US Senate Environment and Public Works Committee](http://www.epw.senate.gov/US_Senate_Environment_and_Public_Works_Committee) accessed February 2016
9. [www.epw.senate.gov/US Senate Environment and Public Works Committee](http://www.epw.senate.gov/US_Senate_Environment_and_Public_Works_Committee) accessed February 2016
10. Zannin, P.H.T., Ferrera, A.M.C. and Szeremetta, B. Evaluation of Noise Pollution in Urban Parks. *Environmental Monitoring Assessment*, 118 2006 pg. 423-433,

~~Environ Health Perspectives; 2007~~ ~~Environ Health Perspectives. 2007 November; 115(11): A536-A537.~~

11. Encarta Premium Dictionary, 2009
12. Data Collection on Ile-Ife residents
13. Enendu, L.O.M. "Sound Recording in Theatre Planning and Installation" 1994 pg.24- Ibadan: Kraft Books 1994 (pp. 24-26)
14. Weber, L, Koomey, J. and Matthews, S. "The Energy and Climate Change Impact of Different Music Delivery Methods". U.S.A. 2007. pg.(pp. 215-216, 215-216)
15. Weber, L, Koomey, and Matthews, S. "The Energy and Climate Change Impact of Different Music Delivery Methods". U.S.A. 2007. pg. 215-216.
16.

[www.vanguardngr](http://www.vanguardngr.com) accessed on July 24, 2015

[www.thenationonline](http://www.thenationonline.com) accessed October, 2015.

17. [www.vanguardonline](http://www.vanguardonline.com) accessed October, 7, 2015
18. Cai Q, Patel M, Coling D, Hu BH. Transcriptional changes in adhesion-related genes are site-specific during noise-induced cochlear pathogenesis. *Neurobiology of disease* 45 2012 pg.723-732
19. Holdren, J. P. Climate-Change Science and Policy: What Do We Know? What Should We Do? Keynote Address, Kalvi Prize Science Forum, International Cooperation in Science, Oslo, September 6, 2010
20. Finegold, L.S., Harris, C.S. and von Gierke, H.E. Community Annoyance and Sleep Disturbance; Updated Criteria for Assessing the Impact of General Transportation Noise on People. *Noise Control Engineering Journal*, 42, 1994 pg.25-30
21. Emielu, Austin. 'Nigerian Highlife Music' ~~Musie~~, Centre for Black and African Arts and Civilization. 2013, (pp. 45-56)-(2013)
22. Emielu, Austin. 'Nigerian Highlife Music' Centre for Black and African Arts and Civilization. 2013, (pp. 45-56)

23. Oyedepo, S.O. and Saadu, A.A. (2010) Evaluation and Analysis of Noise Levels in Ilorin Metropolis, Nigeria *Environmental Monitoring and Assessment*, **160**, pg. 563-577.
24. Ibid
- Anderton, Craig. *Home Recording for Musicians*. New York: Amsco Publications. ~~Publications, (1978)~~ 1978. pg. 8-10)
25. Kadis Jay. *The Science of Sound Recordings*, Focal Press, Elsevier 225 Wyman Street, Waltham, MA 02451, USA, 2012. ~~pg. (pp. 27-28.)~~
26. Ibid
- ~~Kapoor B S and Singh, K Noise the Insidious Killer”, The Tribune of 25 November, (1995) pp.16~~
- Nagi G.K, Dhillon M.K. and Dhillon G.S. ‘Noise Pollution. New Dehli: Common Wealth Publishers. (1999)
27. Kapoor B S and Singh, K Noise the Insidious Killer”, The Tribune of 25 November, 1995. Pg.16
28. Schaffer A.H. Noise and its effects, Administrative Conference of the United States. ~~(1991)~~ 1991
29. Greene, D. Paul and Porcello Thomas ‘Wired for Sound: Engineering and Technologies in Sonic Cultures. Middletown Connecticut. 2005 pg.65
30. ~~Retrieved from www.noise.library/suffer accessed on 14/06/2015~~
- Emielu (Ibid
- Thèberge, Paul. Any Sound You can Imagine: Making Music /Consuming Technology. Middletown ~~Connecticut. Connecticut: Wesleyan University Press. (1997 Pg.6-69)-~~
31. Environ Health Perspectives. 2007 November; 115(11): A536–A537.
- 32.
- Jones. D.M. Chapman A.J. & Auburn T.C.(1981) “Noise in the Environment: Social Perspectives”. www.medscape.com/viewarticle accessed on 14/06/2015
33. Gehring U, Tamburic L, Sbihi H, Davies HW, Brauer M. Impact of noise and air pollution on pregnancy outcomes. 2014, www. US National Library of Medicine, National Institute of Health, accessed on April 22, 2016
34. Gehring U, Tamburic L, Sbihi H, Davies HW, Brauer M. Impact of noise and air pollution on pregnancy outcomes. 2014, www. US National Library of Medicine, National Institute of Health, accessed on April 22, 2016
35. Greene, D. Paul and Porcello, Thomas (2005). *Wired for Sound: Engineering and Technologies in Sonic Cultures*. Middletown Connecticut: Wesleyan University Press.
36. Ibid
- Nagata, ~~M.O. Church Acoustics, Acoustics.~~ Nagata Acoustics ~~News. News, (2011)~~ Vol. 01-9, ~~Nos. No.~~ 165. 2001

37. Oishi and Schacht, J. -"Emerging treatments for noise-induced hearing loss". Expert opinion on emerging drugs ~~2011.Vol.-(2011)~~. 16 (2): pp. 235–45.
 38. Schessel DA,. Recurrence rates of acoustic neuronal in hearing preservation surgery. *Am J Otol* 1992; 13:233-5-
 39. Schessel DA,. Recurrence rates of acoustic neuronal in hearing preservation surgery. *Am J Otol* 1992; 13:233-5
 40. Airo, Erko; J. Pekkarinen; P. Olkinuora. "Listening to music with earphones: an assessment of noise exposure," *Acustica–Acta Acustica*, ~~1996.(1996)~~ pp. 82, 885–894-
 41. Airo, Erko; J. Pekkarinen; P. Olkinuora. "Listening to music with earphones: an assessment of noise exposure," *Acustica–Acta Acustica*, 1996. pp. 82, 885–894
 42. Senturia BH, Marcus MD, Lucente FE. Diseases of the External Ear-An Otologic-Dermatologic Manual. New York: Grune & Stratton; 1980
 43. Senturia BH, Marcus MD, Lucente FE. Diseases of the External Ear-An Otologic-Dermatologic Manual. New York: Grune & Stratton; 1980
 44. Ibid
- Ugwuanyi J.U, Ahemen.I and Agbendeh A.A, “Assessment of Environmental Noise Pollution in Markurdi Metropolis, Nigeria”, J. Pure Appl. Sci. 2004. 6(2), 134-138, 2004.
45. Anomohanran .O, IwegbueIghoroje A.D.A, Marchie. C.M.A, Oghenerhoro I.O and Egbai, I.J.C, (2008)
Investigation of Environmental Nwobodo E.D, “Noise Pollution Level of Abraka in Delta State,
Induced Hearing Impairment as an Occupational Risk Factor among Nigerian Traders”,
Nigeria, Trends in Applied J. of Physiological Sciences Research 3 (4): 292-297
 46. Ochuko, A. (2013) Evaluation of Environmental Noise Pollution in Abuja, the Capital City of Nigeria. *IJRRAS*,~~(2004)~~ 9(1-2), 14, 470-476.14-19.
 47. Ochuko, A. (2013) Evaluation of Environmental Noise Pollution in Abuja, the Capital City of Nigeria. *IJRRAS*, 14, 470-476.
 48. Ochuko, A. (2013) Evaluation of Environmental Noise Pollution in Abuja, the Capital City of Nigeria. *IJRRAS*, 14, 470-476.
 49. Georgiadou, E., Kourfidis, K. and Ziomas, I. Exploratory Traffic Noise Measurements at Five Main Streets of Thessaloniki, Greece. *Global NEST: The International Journal*, **6**, 2004, pg. 53-61.
 50. Cohen, Sheldon. "Sound effects on behavior." *Department of Psychology* 1981, pg 286.

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