



E-ISSN: 2789-9500  
P-ISSN: 2789-9497  
IJCCSL 2022; 2(2): 01-07  
© 2022 IJCCSL  
[www.criminallawjournal.org](http://www.criminallawjournal.org)  
Received: 25-04-2022  
Accepted: 16-06-2022

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## **Environmental protection against telecommunications installations hazards: Regulatory responses in Nigeria, South Africa and India**

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### **Abstract**

Telecommunications is one of the devised ways of meeting communications needs of human beings. To ensure clearer reception of signal of radiofrequencies and microwaves, specific technological devices have to be installed. Following the booming in the global telecommunications market informed by liberalization, privatization and technological advancement in the sector, there has been tremendous upsurge in the number of those providing services as well as subscribers which necessitated the need for corresponding increase in the installation of telecommunications facilities. While installing these facilities and their procedures, some ecological hindrances follow which tend to negate the principle of sustainable development. In order to ensure developmental growth without necessarily compromising the sustainability of the environment, attempts were made and some measures were put in place in terms of laws, regulations and practice to address these environmental challenges. Because telecommunications issues is international, this paper, therefore, examined the laws, regulations, practice and the institutions/bodies put in place to prevent or reduce the negative effects of telecommunications installations on the environment with a comparative study of Nigeria, South Africa and India. It was observed that although there have been tremendous progress in the past decade in the telecommunications industries, the existing regulations and laws have not been adequate to defend the environment against telecommunications installations hazards on one hand, and religiously followed and enforced on the other hand. Some remedies and possible solutions were therefore suggested to achieve adequate protection of the environment against telecommunications installations hazards in the countries under review without necessarily compromising the development of the sector.

**Keywords:** environment, telecommunications, installations, international

### **Introduction**

Protection of environment against negative interference has been a major concern in the international community since the Second World War. After the World War II, the need to chart a new world order became inevitable. The need to unite and create a peaceful co-existence among the warring nations gave birth to the United Nations in 1945 through the signing and ratification of UN Charter by member nations. Since then, the United Nations has been making efforts to meet up with her responsibilities which include fostering conducive environment for the international economic growth as enshrined in the UN Charter.

Following the independence of many countries after the World War II, there were agitations from these newly independent countries to have total regulation over their natural resources and this led to the coming into being of a declaration known as Permanent Sovereignty over Natural Resources (PSCNR) <sup>[1]</sup>. The adoption of PSCNR, no doubt, increased the economic activities of states by way of exploration of their natural resources in their environment for their well-being. These activities which include the development in the telecommunications industries posed some environmental challenges to the world and this led to the Stockholm Declaration of the United Nations Conference on the Human Environment of 1972. This is perhaps the first major law or instrument on international environmental issue that introduced the concept of safeguarding natural resources unto the plan of international economic issue <sup>[2]</sup>.

Globalisation is turning the whole world into a single entity with telecommunications as a essential instrument for meaningful survival. And because telecommunications and its corresponding environmental issues are international phenomena, a comparative examination of selected countries becomes imperative. In this paper, therefore, laws and policies regulating; positioning and erection of telecommunications mast and other allied matters in Nigeria, India and South Africa are examined.

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In doing this, efforts will be made to disentangle the scheduling and environmental confusion into which this area of the telecommunications rules is enmeshed and proffer strategic and workable alternatives to remedy the logjam.

### **Environmental protection against telecommunications installations hazards in Nigeria**

The primary law inside the telecommunications enterprise in Nigeria is the Nigerian Communications Act, 2003. The Act set up the Nigerian Communications commission (NCC) as number one regulatory body of the telecommunications sector in the country<sup>[3]</sup> with various oversight functions which include making regulations and guidelines for effective running of telecommunications industry in the country<sup>[4]</sup>. However, there are other laws and regulations administered by other bodies that have relevance with the protection of environment against telecommunications installations hazards but because of the pivotal and primary role of the NCC, the Nigerian Communications Act, 2003 will be considered first.

#### **Nigerian Communications Act, 2003**

The Constitution of Federal Republic of Nigeria, 1999 (as amended)<sup>[5]</sup> vests the National Assembly with power to make laws on anything placed on the exclusive legislative list to the exclusion of the States. Telecommunications is an item provided for in the 2nd Schedule (part 1) particularly under items 46, 66 and 68 of the exclusive list of the Constitution. In the exercise of this power, the National Assembly enacted the Nigerian Communications Act<sup>[6]</sup> (NCA) to create and provide a regulatory framework for the Nigerian communications industry and all matters related to it. The NCA empowers the Commission to propose, adopt, produce and implement technical specifications and standards which are meant for the importation and use of, connecting or interconnecting such communications equipment and systems in Nigeria<sup>[7]</sup>.

#### **Procedures on technical specifications for the installations of masts and Tower, 2009**

In exercising its power under the Act to make regulations and guidelines, the Nigerian Communication Commission (NCC) issued Guidelines on Technical Specifications for the Installations of Masts and Towers in April, 2009. The guidelines provide for dealings to prevent environmental problems in the course of mast and tower constructions and installation. The objectives of the guidelines, particularly in respect of citing telecommunications towers and masts include reducing their number, ensure the protection and promotion of public safety. It is also to mitigate the hostile visual impacts on the community even though encouraging the provision of telecommunications service to members of the public<sup>[8]</sup>.

From the guidelines, telecommunications operators are required to be aware of the requirements of the Nigerian Communications Act in the sitting of telecommunications masts and towers and to be guided also by the provisions of the Guidelines on Collocation and Infrastructure Sharing<sup>[9]</sup> that were given by the Commission<sup>[10]</sup>.

In order to mitigate adverse visual impacts of the structures of towers and antennas on the community, stealth, camouflage design of towers, and antennas are to be put in placed<sup>[11]</sup>. Also, to safeguard the public against the exposure to heat, smoke and noise pollution arising from generating sets, all towers sited in residential areas are expected to comply with the set-back stipulated in the Guidelines<sup>[12]</sup>. Though, the

guidelines provide in general term that any telecommunications towers whose height is above 25 metres would not be permitted within areas delineated as residential<sup>[13]</sup> it however provides that where such tower exceeding 25 metres height is permitted within residential area, it should only be erected at least 5 metres away to the next granted property, apart from the fence<sup>[14]</sup>. According to the guidelines, the maximum height of any telecommunications tower is 150 metres<sup>[15]</sup>. However, the Commission may approve the erection of a tower exceeding 150 metres high provided that the increased height of the tower will not become harmful to members of the public's health, their safety or welfare. It also must be ensured that it will not have damaging effect on the neighbourhood<sup>[16]</sup>. Where the towers are in excess of 150 metres height, the set-back shall be a minimum of 50 metres from the 'right of way' of all controlled access roads, federal and state roadways which are designated as freeways<sup>[17]</sup>.

#### **National environmental standard and regulations enforcement agency (Establishment) Act 2007**

The significant development of legal regime for the environment in Nigeria was from humble beginnings<sup>[18]</sup>, having gone through series of stages. The most important of all these developmental stages is the passage into law and coming into force in 2007 of the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act (NESREA), which can be adjudged as relatively the most comprehensive environmental law in Nigeria, compared to previous laws.

The Act established<sup>[19]</sup> the NESREA as Nigeria's lead and primary environmental protection agency<sup>[20]</sup>. The Act empowered the Agency to ensure compliance with laws, policies, guidelines and standards on environmental matters. The power extends to coordinate and liaise with stakeholders, within and outside Nigeria on matters of environmental standards, environmental regulations and enforcement. The agency is to enforce compliance with the provisions of international conventions, protocols, agreements, and treaties on the environment, including climate change, desertification, biodiversity, conservation, forestry, chemicals, hazardous wastes, ozone depletion, marine and wild life, pollution, oil and gas, sanitation including other environmental agreements that may come into force from time to time<sup>[21]</sup>.

#### **Environmental Impact Assessment Act 1992**

The enactment of the Environmental Impact Assessment Act (EIA) is another development in the Nigerian laws on environment. One of the objectives of the EIA is that before any individual, corporate body or government agencies can take any decision or embark on activity (ies) which may have effect on the environment, an environmental impact assessment of such action should be considered<sup>[22]</sup>. The EIA empowers the Agency with the approval of the Presidency to make regulations prescribing the list of projects or classes of projects where environmental impact assessment may or may not be required<sup>[23]</sup>. In case of violation of the provisions of the EIA or any regulations made in the law, an individual or corporate body may be liable to a fine or terms of imprisonment<sup>[24]</sup>.

#### **Environmental protection against telecommunications installations hazards in South Africa**

Among the countries considered as emerging economies of

the world is South Africa, considering its rapid development of every sector of its economy, including telecommunications sector. The South African telecommunications sector, like many other countries, developed from strict monopolised market by government to the liberalisation and privatisation now embraced globally <sup>[25]</sup>. The telecommunications development in South Africa in the year 2000 witnessed the birth of a primary regulatory body known as “Independent Communications Authority of South Africa (ICASA) as a result of merger of South African Telecommunications Regulatory Authority (SATRA) and Independent Broadcasting Authority (IBA). The functions hitherto performed by SATRA and IBA are now performed by Independent Communications Authority of South Africa (ICASA) <sup>[26]</sup>.” This actually marked the deregulation of the telecommunications sector in South Africa from Government monopoly to private participation.

Due to speedy development of the telecommunications industry in South Africa, and the increasing demand for radio telecommunications services and new technologies in the telecommunications industry, siting, the location, and deployment of telecommunications infrastructures have become issues of “particular interest to both local communities and local government alike, with debate focusing on visual amenity and public health and hence the need for regulation that enables appropriate development of this kind of infrastructure <sup>[27]</sup>.” However, because of the system of government in operation in South Africa where the regulation over the installation of telecommunications installations falls within the domain of community planning and by the provision of the Constitution, is a community competency <sup>[28]</sup> it does not seem that there is a singular document made by the primary regulatory body, ICASA that comprehensively addresses the environmental challenges in the telecommunications sector. Although, ICASA is empowered by the Act to inspect transmitters or other communications apparatus used for communications <sup>[29]</sup>, approve technical parameters and transmitter and transmission characteristics to be used by licensees <sup>[30]</sup> and monitor the electronic communications sector to ensure compliance with the Act and the underlying statutes <sup>[31]</sup>. From the power of ICASA to inspect, monitor and approve the telecommunications apparatus that may be used by licensees, it may be inferred that while discharging these functions, ICASA will be guided by the need to protect the environment. In other words, during the inspection and monitoring of telecommunications installations, ICASA may not approve or may disapprove any installations that may be injurious to the environment.

#### **Telecommunication Infrastructure Policy in South Africa**

Because of the fact that building and other structural developments are within the legislative purview of the municipal province, the Cape Town Council made a policy known as City of Cape Town Cellular Telecommunication Infrastructure Policy in 2002. When the Policy was reviewed in May, 2014, ten objectives were included therein, the relevant ones among them to this paper include: improvement and maintenance of communication, insuring that Telecommunications Infrastructure is placed in the best location, maintaining the visual integrity, special character and amenity of the City of Cape Town and ensuring the safety, protecting the health and wellbeing of the residents of Cape Town <sup>[32]</sup>.

Under objective ten of the policy, the protection of the population has to be ensured with regard to allowable Electromagnetic Emission (EME) levels. Having realized the public concerns and on-going research and debate on the effects of EME on public health, the Cape Town Council adopted suitable precautionary measures, took preventative action and underwent reactive investigation where it is necessary. In the meantime, Antennae are to be located and positioned 50 meters away from habitable structures directly in front of the antennae (at the same height) <sup>[33]</sup>. In any case, no Telecommunications Infrastructure (TI) or “combination of such infrastructure may at any time cause the public to be exposed to Radiofrequency (RF) levels that exceed the International Commission on Non-Ionizing Radiation Protection (ICNIRP) public exposure guideline in any occupied space or location to which the public reasonably has access” <sup>[34]</sup>.

#### **National Environmental Management Act 1998**

The South African National Environmental Management Act (NEMA) was assented to by the President in 1998. The Act is made with a view to generally catering for the management and protection of environment for sustainable development. It is acknowledged in the introduction to the Act “that many inhabitants of South Africa live in an environment that is harmful to their health and well-being whereas everyone has the right to an environment that is not harmful to his or her health or well-being”. The Act, therefore, enjoins the State to respect, protect, promote and fulfil the social, economic and environmental rights of everyone by striving to meet their basic needs.

The Act maintains that the integration of social, economic and environmental factors is required in the planning for sustainable development. Also, execution and evaluation of decisions is needed to ensure that desired development serves the good of the present and the future generations. While promoting justifiable economic development, the State must ensure that everyone has the right to have the environment protected for the benefit of present and future generations.

Environment, according to the Act, “means the surroundings within which humans exist which are made up of the land, water and atmosphere of the earth, micro-organisms, plant and animal life.” <sup>[35]</sup> It also means the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and his well-being <sup>[36]</sup>. According to the Act <sup>[37]</sup>, the environment may be polluted by “any change in the environment caused by substances, radioactive or other waves, noise, odours, dust and or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, where that change has an adverse effect on human health or his well-being <sup>[38]</sup>.” The crux of all the guiding principles of the Act is that all forms of pollution and degradation of the environment are to be avoided altogether and where such absolute avoidance is impossible, such pollution and degradation should be minimized and remedied <sup>[39]</sup>.

Remarkably, the provisions of the NEMA, as they relate to the safety of the environment against any form of pollution, no doubt, envisaged the likely pollution of the environment by the telecommunications installations. Thus, the provisions can be interpreted to accommodate protection of environment against telecommunications installations hazards. There are other laws in South African which tend to protect the environment against any form of pollution and hazards and



which must be considered in siting of Telecommunications Infrastructures in the Country. These laws include: National Building Standards and Building Regulations Act of 1977, Electronic Communications Act of 2005, Hazardous Substances Act of 1973 and National Heritage Resources Act of 1999.

### **Environmental protection against telecommunications installations hazards In India**

Telecommunications in India started with the introduction of telegraph <sup>[40]</sup>. The Indian postal and telecommunications sectors are one of the worlds' oldest postal and telecommunications sectors. In 1850, the first experimental electric telegraph line started between some towns in India. In 1851, its usage was extended to "the British East India Company. The Posts and Telegraphs Department occupied a small corner of the Public Works Department at that time <sup>[41]</sup>." In November, 1858, construction of 4,000 miles (6,400 km) of telegraph lines connecting other towns started <sup>[42]</sup>. In 1881, license was issued to the Oriental Telephone Company Ltd. of England for opening telephone exchanges in some selected cities in India and the first formal telephone service was established in the country <sup>[43]</sup>.

Unarguably, since the first introduction of telegraph in India, the telecommunications industry has been growing at a great pace <sup>[44]</sup>. The rapid developmental pace in the telecommunications sector was facilitated by liberal policies of the government that provide easy market access for telecommunications equipment and a fair regulatory framework for offering telecommunications services to the Indian Consumers at affordable prices <sup>[45]</sup>. This development had also led to the establishment of the regulatory body called Telecom Regulatory Authority of India (TRAI) in 1997.

### **Telecom Regulatory Authority of India Act 1997**

The Telecom Regulatory Authority of India is established by the provision of the Telecom Regulatory Authority of India Act, 1997 <sup>[46]</sup>. The Act empowers the Authority to perform various functions which include to ensure that service providers maintain technical compatibility and effective inter-connection in the discharge of their services. The Authority may, in the discharge of its functions under the Act, "issue such directions from time to time to the service providers, as it may consider necessary." <sup>[47]</sup> The Act authorizes both the Government at the centre and the Authority to make rules and regulations in enforcing the provisions of the Act <sup>[48]</sup>.

In March, 2012, the Department of Telecommunication (DoT) of India, a department under the supervising Ministry, set up a committee to observe issues relating to siting of mobile base stations towers in India <sup>[49]</sup>. Prior to the setting up of the committee, the "siting clearances for installation of Base Transceiver Station (BTS) towers were being issued by Standing Advisory Committee on Frequency Allocation (SACFA). These clearances are issued after getting 'no objection' from various SACFA members (such as Airport Authority of India) who carry out detailed technical evaluation, including field surveys <sup>[50]</sup>." Also, the technical examination done by SACFA members targets Aviation hazards, Interference (Electro Magnetic Interference (EMI)/Electro Magnetic Compatibility (EMC) and Obstruction to line of site of existing or planned networks to all pending and future networks proposed.

In the committee's report, it was observed that clearances for siting of Base Station and Towers are allotted without bias to

other bye-laws that are applicable, regulations, rules of Local authorities such as Community Corporation. In other words, before installation of towers, companies providing necessary services are meant to obtain relevant clearance(s) from concerned local authorities or state Government agencies. At present, there is no national guideline on siting of mobile BTS towers and there appear no restriction for siting of the mobile BTS towers <sup>[51]</sup>. This is because of the non-presence of national guidelines as well as the fact that some state governments issued their own regulations on siting of Base Stations. In the local bye-laws issued by Delhi and West Bengal, certain precautionary measures are to be observed while giving permission for installation of towers. These precautionary measures include avoidance of setting up of base station antennas schools and hospitals' premises because children as well as patients are likely to be affected by Electromagnetic Field (EMF) radiation. Also, installation of base antennas in narrow lanes is to be avoided to reduce the risk of wind connected calamity and earthquake. As part of the precautionary measures, Base station antenna is required to be sited at about 3 metres away from any building close by.

### **The Environment (Protection) Act 1986**

The Environment (Protection) Act (EPA) 1986 of India was enacted on 23rd May, 1986. The EPA provides for the development and protection of the state of the environment. It also provide for other matters related to issues of environment and this happen the moment decisions were taken at the United Nations Conference on the Human Environment held in June, 1972 at Stockholm where which India participated. At the conference, it was felt and considered necessary by the India Government that appropriate steps for the protection and improvement of human environment need to be taken to prevent hazards to human beings, other living creatures, plants and property. The EPA gave working definition to on what Environment include such as "water, air and land and the inter- relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property" <sup>[52]</sup> while environmental pollutant is defined to mean 'any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, injurious to environment <sup>[53]</sup>."

The EPA empowers the Central Government to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution <sup>[54]</sup>. Such measures, according to the Act, may "include: co-ordination of actions by the State Governments, officers and other authorities, planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution, laying down standards for the quality of environment in its various aspects, laying down standards for emission or discharge of environmental pollutants from various sources whatsoever <sup>[55]</sup>." In the exercise of these powers, the Central Government may delegate the powers to any Officer, to the State Government or any other authority <sup>[56]</sup>. The Act also gives powers the Central Government to make rules and give direction in carrying out its functions under the Act <sup>[57]</sup>.

### **Environment (Protection) Rules, 1986**

These Rules were made by the Central Government pursuant to the powers conferred by Sections 6 and 25 of the Environment (Protection) Act (EPR) 1986. The Rules contain

rules and guidelines for the protection of the environment for all the parties concerned. One of the relevant areas of the Rules to this article is the prohibition and restriction on the location of industries and the carrying on of processes and operations in different areas. The rule prohibits or restricts the location of industries, processes and operations in different areas. The Central Government, by Order 5 Rule 1 of the Rules, may take into consideration some factors which include: Standards for quality of environment in its various aspects laid down for an area, the maximum allowable limits of concentration of various environment pollutants (including noise) for an area, the likely emission or discharge of environmental pollutants from an industry and the process or operation proposed to be prohibited or restricted. By the same Rule, the Central Government may also take into consideration the topographic and climatic features of an area, the biological diversity of the area which needs to be preserved, environmentally compatible land use and net adverse environmental impact likely to be caused by an industry, process or operation proposed to be prohibited or restricted, proximity to a protected area under various Acts and proximity to human settlements.

The Central Government, while prohibiting or restricting the location of industries or carrying on of business in an area has the discretion to consider any other factors considered to be relevant to the protection of the environment.

A careful appreciation of the objectives of the Act as well as the Rules shows that any telecommunications installations that is likely to affect the conduciveness of the environment may not be allowed, based on the requirements of the EPA and EPR. One interesting thing worthy of note about the Act is that no suit, prosecution or other legal proceeding can be maintained against the Government or any officer or other employee of the Government or any authority constituted under the Act or any member, officer or other employee of such authority in respect of anything which is done or intended to be done in good faith in pursuance of the Act or the rules made or orders or directions issued thereunder<sup>[58]</sup>.

### Conclusion and recommendations

In this paper, efforts have been made to trace the international efforts in the protection of the environment against all sorts of environmental pollutants through promulgation of different international instruments. It has been shown that after World War II and following independence of many countries, there were agitations for economic sovereignty by these political sovereign States which were granted and these led to various economic activities which include activities in the telecommunications sectors. These unregulated economic activities resulted in the environmental degradation and posed dangers to human survival.

Also, attempt was made to appraise the laws and regulations of various governments (Nigeria, South Africa and India) aimed at curbing environmental pollution as it relates to telecommunications industries. The conclusion that can be drawn here is that, although efforts of various governments in the protection of environment against telecommunications installations hazards are commendable, the multiplicity of regulations and regulators, non-uniformity of standards and lack of free access to court etc. play down these governmental efforts.

Following the above highlighted issues playing down the efforts of governments in curbing environmental pollutions resulting from telecommunications installations, it is

recommended that relevant regulatory bodies in the telecommunications industries and the protection of environment should jointly engage in a comprehensive researched on the serious effect of exposure of the public to non-ionizing electromagnetic radiation on human health. This will not only go a long way in dousing the public apprehension in siting telecommunications installations near residential apartment, but will also provide data bank for analysis and further research. It is also recommended that precautionary measures should be developed and taken, while the research is going on in order to reduce exposure to even non-ionizing electromagnetic radiation.

Public alertness should also be made to enlighten the public on the existing laws and regulations meant for the protection of environment against any form of pollution in general and the telecommunications installations hazards in particular. It is equally important to identify the areas of overlapping functions in the legal frameworks with a view to streamlining them to ensure national economic growth and security. In order to prevent road damage in the process of telecommunications installations, any time an operator wants to lay telecommunications cable and other facilities and equipment, duct bank<sup>[59]</sup> practice should be encouraged by government in the construction of road so that whenever any telecommunications operator wants to expand its network she will not need to dig the road but make use of the duct bank already buried under the ground. Operator must also comply with provision of the laws ensuring best engineering practice in the manufacturing and installation of telecommunications towers/masts in order to prevent unnecessary collapse of the tower or other related disaster.

Telecommunication operators should be made to design and construct their Base Station such that it can accommodate at least three (3) other service providers on a matching edifice<sup>[60]</sup>. This methods is what is technically referred to as co-location. In other words, a telecommunications operator while constructing its facilities must build it in such a way that at least three (3) other operators can share the facilities. This is aimed at preventing the proliferation of telecommunications facilities such as masts and towers in a particular vicinity. One of the advantages of collocation is that it saves the operators from spending money in building more base stations especially in urban and areas already covered by some other operators. Collocation can also reduce the level of air and noise pollution resulting from fossil fuel power generating set used in powering base stations in the sense that two or more collocating operators will only need a power generating set to power the collocated site.

It is worthy to mention also that experts have argued that the practice of co-location may also constitute some further environmental hazard, though, the objective behind co-location is appreciable<sup>[61]</sup>. In a co-located Base Station, the tower/mast must be reasonably high to accommodate more antennas. Thus, the height of the tower constitutes adverse visual impact especially for air navigation while the increase in number of antennas will increase the amount of electromagnetic emissions/radiation which, to some, is injurious to the health.

### References

1. This International Treaty in its famous paragraphs 1 and 2 emphasises the right of peoples and nations to have permanent control over their wealth and resources which is expected to be exercised in the best interest of the state.

- It further states that the exploitation and appropriation of such resources should in the line with the rules and condition to the benefit of the people.
2. Among the notable provisions of the Stockholm Declaration are Principles 2, 3 and 5 which provide as follows: Principle No 2 states that earth's natural resources which include the air, the land, water, flora and fauna and important representative of natural ecosystem must be protected for the benefit of present and future generations via a planned, careful and control that is suitable. The third Principle states: "The capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable restored or improved." Principle 5: The resources of the earth that are non-renewable should be employed in such a manner that will protect against the danger of their future extinction and to ensure that advantage from such employment are enjoyed by all human.
  3. S.3 (1) Nigerian Communications Act (NCA), 2003, Cap N9, LFN, 2004.
  4. S.4(1) (i) of the NCA, which empowers the Commission to make and ensure compliance of such regulations as may be necessary under the Act and to effect implementation of the provisions of the Act. See also Section 70 of the NCA.
  5. Sections 4(2) and (3) thereof.
  6. Nigerian Communication Act, Cap N97, LFN, 2004.
  7. Ibid, Section 4(1)(I).
  8. Chapter One, Section 3(1) of Guidelines on Technical Specifications for the Installation of Telecommunications Masts and Towers issued on 9<sup>th</sup> April, 2009.
  9. Collocation and Infrastructural sharing is one of the ways by which the environment is protected from the adverse impacts of telecommunications installations. In the operators' desire to ensure quality of service to all their subscribers and subsequent rollout of towers and masts, there is bound to be proliferation of masts and towers in a particular vicinity.
  10. Chapter One, Section 3 (1) of Guidelines on Technical Specifications for the Installations of Towers and Masts (GTSITM) 2009.
  11. Ibid, Chapter One, Section 3 (1).
  12. (GTSITM) 2009, Chapter One, Section 3 (3).
  13. (GTSITM) 2009, Chapter One, Section 3 (4).
  14. (GTSITM) 2009, Chapter One, Section 3 (5).
  15. (GTSITM) 2009, Chapter Five, Section 1 (a).
  16. (GTSITM) 2009, Chapter Five, Section 1 (b).
  17. Ibid, Chapter Five, Section 9 (b).
  18. Ladan M.T., *Materials and Cases on Environmental Law and Policy* (ECONET Publishers, Zaria, Nigeria, 2004). Pp. 117-244.
  19. Section 1 (1), National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007.
  20. Ibid, Section 1 (2) (a).
  21. Ibid, Section 7.
  22. Sections 1 (a) and 2 (4) of the Environmental Impact Assessment Act, 1992, now embodied in Cap E12, Vol 5, Laws of the Federation of Nigeria, 2010.
  23. Ibid, Section 59.
  24. Ibid, Section 60.
  25. Robert B. Horwitz, 'South African Telecommunications: History and Prospects' <<http://www.vii.org/papers/horwitz2.htm>> accessed on 06 July 2020.
  26. ibid
  27. 'Draft Telecommunication Infrastructure Policy' <[https://www.capetown.gov.za/en/Documents/Draft\\_Telecom\\_Infrastructure\\_policy\\_Jan\\_2011.pdf](https://www.capetown.gov.za/en/Documents/Draft_Telecom_Infrastructure_policy_Jan_2011.pdf)> accessed on 20 June 2019.
  28. The Council possesses the competence under the National Building Standards and Building regulations Act 103 of 1977 and its regulations to make law and regulates certain matters with specific reference to Section 7 of the Act directing the Council to ensure buildings and structures do not constitute threats to human life..
  29. See: Section 4 (3) (1) of Independent Communications Authority of South Africa Act, 2000 (as amended in 2009).
  30. Ibid, Section 4 (3) (f).
  31. Ibid, Section 4 (3) (b).
  32. See the Revised Version of Telecommunication Infrastructure Policy, May 2014, also available at <[http://www.capetown.gov.za/en/PublicParticipation/Documents/HYS\\_Draft\\_Telecommunication\\_Policy.pdf](http://www.capetown.gov.za/en/PublicParticipation/Documents/HYS_Draft_Telecommunication_Policy.pdf)> and accessed on 29 July 2019.
  33. Ibid, Objective 10.3.
  34. Ibid.
  35. See: Section 1 (1) (xi) of the National Environmental Management Act, 1998.
  36. Ibid.
  37. Ibid, Section 1 (1) (xxiii).
  38. Ibid.
  39. Ibid, Section 2 (4) (a).
  40. Telecommunications in India, <[http://en.wikipedia.org/wiki/Telecommunications\\_in\\_India](http://en.wikipedia.org/wiki/Telecommunications_in_India)> accessed on 06 July 2014. See also 'Indian Telecommunication History', Vol. 1, Telecom India Daily available at <<http://www.telecomindiaonline.com/indiantelecomhistory>> accessed on 06 July 2019.
  41. Ibid.
  42. Ibid.
  43. Ibid.
  44. Telecom Regulatory Framework and Legislations in India, <<http://www.slideshare.net/Lexplore/telecom-regulation-in-india>> accessed on 07 July 2019.
  45. Ibid.
  46. See: section 3(a) of Telecommunication Regulatory Authority of India Act, 1997.
  47. Ibid, section 11(1).
  48. Ibid, section 13.
  49. Ibid, Sections 35 and 36.
  50. Report of Departmental Committee on BTS Towers, available at <[http://dot.gov.in/sites/default/files/Committe\\_Report\\_on\\_BTS\\_towers.pdf](http://dot.gov.in/sites/default/files/Committe_Report_on_BTS_towers.pdf)> accessed on 05 August, 2019.
  51. Ibid.
  52. Ibid.
  53. See: Section 2(a), Environment (Protection) Act, 1986.
  54. EPA 1986, Section 2(b).
  55. EPA 1986, Section 3(1).
  56. EPA 1986, Ibid.
  57. Ibid, Section 23.
  58. Ibid, Section 6.
  59. Ibid, Sections 18 and 22.
  60. This is a construction practice wherein pipes are buried

under the ground for electrical cable or other cable installation. It prevents frequent digging of the ground in case of repair or future installation.

61. See: Chapter 5, S. 9 (7) (a) of Guidelines on Technical Specifications for the Installation Telecommunications Masts and Towers issued on 9<sup>th</sup> April, 2009.
62. A Keynote Address delivered by Engr. Earnest Ndukwe, Executive Vice Chairman, Nigerian Communications Commission at the Workshop on Electromagnetic Compatibility Problems in Industrial and Commercial Installations/Equipment held at University of Lagos on June 27, 2005.