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Strengthening the Legal and Institutional Framework for Air Pollution Control in Kenya

A research project submitted in partial fulfillment of the requirements for the award of the degree of Master of Laws (LLM) of the University of Nairobi

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Declaration

I Mukoya Eric Joe Odongo hereby declare that this is my original work and has not previously been presented in any other university or institution. In this research where references have been made, such works has been duly acknowledged. In this regard, it is hereby presented in partial fulfillment of the requirements for the award of the LLM Degree in Environmental Law.

Signature: .....

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This thesis has been submitted with my approval as the University of Nairobi Supervisor.

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Dedication

I dedicate this work to my family that sat down to encourage me, chipping in with ideas, though not lawyers. Their thoughts provoked my reasoning, opening up critical reflection of the subject of air pollution.

Similarly, my friends Sellah King'oro, Finality Mwendandu Kusuania, Florence Oracha, Spanse Achieng while in Sweden and Melissa Ng'ania who never relented to push me a step, always further from a seemingly tedious and mundane process of writing and re-writing. Besides, my gratitude to local communities in highly polluted environments who had conversations with me on air pollution, information that I then used to review relevant literature. The dialogue outcome of these communities though not part of the documented information, did give insights on what reports, documents and studies to interact with. Therefore, the people of Mariakani, Changamwe (Mombasa and Kilifi Counties respectively), Athi River and Kitengela, will not rest till this battle is won for people and nature to live free of pollution.

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Listed of cases

1. Arbitral Trib., 3 U.N. Rep. Int'l Arb. Awards 1905 (1941)
2. Civil Suit No.265 of 2010
3. ELC CASE NUMBER 235 OF 2017, in the Environment and Land Court Sitting in Kajiado. (2017), eKLR
4. ELC Petition No. 1433 of 2013, Environment and Land Court, Nairobi
5. Hosea Kiplagat & 6 others v National Environment Management Authority (NEMA) & 2 others [2018] eKLR
6. *Mbole Nzomo Anthony & 3 others versus Shreejii Enterprises Ltd & 4 others*, found on http://kenyaliisync.africanlii.org/za/judgment/high-court-mombasa/2011-40, accessed on 05/07/2019
7. Patrick Kamotho Githinji& 4 others (suing for and on behalf of aggrieved residents of Muthurwa Estate within Nairobi County) v Resjos Enterprises Ltd & 4 others [2016] eKLR
8. R (on the application of Client Earth v Secretary of State for the Environment, Food and Rural Affairs (Respondent), (UKSC, 2015)
9. Republic v Faith Naome Kabeso [2019] eKLR
10. Republic v National Environment Management Authority & another Ex-Parte Philip Kisia & City Council of Nairobi [2013], eKLR

List of legislations

International Legal Instruments

1. International Covenant on Economic, Social and Cultural Rights Articles, 7 (b), 10(3), 12
2. Stockholm declaration of the United Nations Conference on the human environment (1973), UN Doc A/CONF.48/14/. Rev. 1 at 3
3. Sustainable Development Goals (SDGs), under UNDP
4. The Rio Declaration Earth Summit
5. United Nations, Declaration of the United Nations Conference on the Human environment, www.un-documents.net/unchedec.htm accessed on 4 April 2018

Kenya Legal Instruments

6. Government of Kenya, Air Regulations, (2014)
7. Government of Kenya, Climate Change Act (2016)
8. Government of Kenya, Energy Act (2019)
9. Government of Kenya, National Policy on Environment, (2013)
10. Government of Kenya, National Transport and Safety Authority Act
11. Government of Kenya, NEMA, National guidelines for strategic environmental assessment in Kenya, (Revised, 2011)
12. Government of Kenya, Penal Code
13. Government of Kenya, The Constitution (2010)
14. Government of Kenya, Traffic Act
15. Government of Kenya, Environmental Management and Coordination Act, (2015) amended

LIST OF ABBREVIATIONS AND ACRONYMS

ACCNNR	African Convention on the Conservation of Nature and Natural Resources
AQR	Air Quality Regulations
CAA	Clean Air Act
CPR-T	Common Pool Resources Theory
EAC-T	East Africa Community Treaty
EIAs	Environmental Impact Assessments
ELC	Environment and Land Court
EMCA	Environmental Management and Coordination Authority
ERMA	Environmental Risk Management Authority
EPA	Environmental Protection agency
GDP	Gross Domestic Product
GESIP	Green Economy Strategy and Implementation Plan
IEIA	Integrated Environmental Impact Assessment
NEMA	National Environment Management Authority
NEP	National Environmental Policy
PP	Precautionary principle(s)
PPP	Polluter Pay Principle
PSD	Principle of Sustainable Development
REG	Responsive Environmental Governance
REREC	Rural Electrification and Renewable Energy Corporation
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
UK	United Kingdom

UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
US/A	United States of America
WHO	World Health Organization

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Chapter One: State of air pollution in Kenya

1.0 Background

Uncleanness of indoor or outdoor air by a collection of gases and solids that alter its natural qualities is known as air pollution. Some of these pollutants, which are highly considered to be harmful to the quality of air include the Particulate Matter (PM 2.5 and PM 10), carbon monoxide, ozone, black Carbon, sulfur dioxide and nitrogen oxides. The high presence of such pollutants and gases in the air reduces the qualities that make it breathable by humans, animals and certain plants.[1]Writers such as Mengesha Admasu have intoned that impure air is the atmospheric condition where harmful substances are in excess and create undesirable impact on man and his environment.[2]

Air pollution is fast becoming a major global concern and is estimated to have caused 4.2 million deaths globally in 2016, though 90% of those occurred in law and middle-income countries. Indoor smoke continues to pose health threats for almost 3 billion people who rely on biomass, kerosene and coal to cook and heat their homes. Needless to say, that many other effects including exposure to heart and respiratory diseases such as Asthma and stroke, besides extreme vulnerability to food insecurity, higher incidents of non-communicable diseases and an unreasonable economic burden of illnesses that often affects more, the lowly and those resident in under-resourced settlements.[3]A study by Guy Hutton point to rapid

[1]World Health Organization, What is air pollution? (World Health Organization, June 28 2019). http://www.searo.who.int/topics/air_pollution/what-is-air-pollution.pdf?ua=1, accessed on 28/06/2019

[2]Mengesha Admasu & Mamo Wubeshet, Air Pollution, Lecture notes, Ethiopia Public Health Training Initiative, University of Gondar, 2012 https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_science_students/airpollution.pdf, access on the 28/06/2019

[3]Christina Nunnez, Climate 101: Air pollution, (Climate 101, February 2019) <https://www.nationalgeographic.com/environment/global-warming/pollution/, accessed on 28/06/2019

industrialization, growth in world population, pressure on natural resources and consistent application of technologies that are not pollution averse. In fact, Hutton evidences that in 2010 the damage costs of air pollution stood at US $ 3 trillion, which was equivalent to 5.6% of the World's Gross Domestic Product, and the likeliness of reversing such a condition is considerably unimaginable. For instance, in places like the United States of America, despite being a first world country about 40% of the population estimated to be 140 million people is faced with possibility of disease and premature death.[4]

About 712,000 deaths in Africa are as a result of air pollution. Major contributing factor include irresponsible means by which production and consumption of energy resources across sectors like industries, motor vehicle transport and household that are key sources.[5] Comparatively this is 20% more that are caused by unsafe drinking water and three times higher measured against lives lost out of malnutrition.[6]In Kenya, especially urban centers studies by researchers such as Prof. Michael Gitari demonstrate that quality of air within the city of Nairobi in 2015 was 10 times more dangerous compared to the World Health Organization standard of 20 micrograms per cubic metre for key air pollutants. In fact, there are fears that levels of carcinogenic elements in Nairobi's air likely causing cancer are 105 micrograms per cubic meter, which is quite high.[7] In an earlier study carried out by University of Nairobi's Institute of Nuclear Science and Technology conducted in partnership with Gothenburg University of Sweden and

[4]Guy Hutton, Air Pollution, Global Damage Costs of Air Pollution from 1900 to 2050, Assessment Paper (2011) Copenhagen Consensus on Human Challenges

[5]United Nations, African Regional Implementation Review for the 14th Session of the Commission on Sustainable Development A report of atmosphere and air pollution (CSD-14, 1 May 2006), <https://sustainabledevelopment.un.org/content/documents/ecaRIM_bp2.pdf, 06 July 2019> accessed on 06/07/2019

[6]Linsey Chutel, Scientists are exactly sure how bad air pollution is in Africa, but think its worse than we thought, (9, February 2017)<https://qz.com/africa/905656/air-pollution-is-increasing-in-africa-along-with-rapid-urbanization/, accessed on 28/06/2019

[7]Michael Gitari, Air you breathe in Nairobi may kill you, (Daily Nation, 15 May, 2015) https://www.nation.co.ke/counties/Air-you-breathe-in-Nairobi-may-kill-you--says-research/1107872-2651584-grng29z/index.html> accessed on 29/06/2019

Columbia University Earth Institute, it was indicated that exposure to poisonous and contaminated air increase risk to develop cardiovascular and respiratory diseases. This assertion vindicates the position of the economic Survey of 2014 that showed as many as 14, 823, 864 cases of illnesses were a direct result of respiratory infections.[8] Data from Economic Survey of 2017 indict air pollution as the main precursor to lung diseases among 19.9 million Kenyans annually.[9]

Although there are claims that breathable air has reduced in quality, the country has in place mechanisms directed at environmental sanity. Kenya is party to the Sustainable Development Goals by the objectives set in the Vision 2030 blue print for development. In particular goal 3 speaks to good health and well-being of the people, while 7 targets enhanced use of clean energy that can remove masses from poverty if it is attained, but importantly place them in a state of increased resilience with regards to indoor pollution following reduced reliance on biomass and other dirty fuels. Further at Goal 11, the SDGs focus on the need to have sustainable cities and communities, which squarely considers positive aspects of urbanization. More so at Goal 13, the country has committed to put in place measures that guard against effects of climate change.[10] The United Nations has cautioned, should there be failure to live within the precincts of SDGs, then a likely rise beyond the 2.5 times of the urban dwellers exposed to outdoor air pollution, recorded in 2016. Worse more because it will affect women and children. Therefore, a call has been made for laws, policies and programs that not only

[8] Ibid
[9] Kenya Bureau of Statistics, Economic survey, (2017) https://www.theelephant.info/documents/kenya-national-bureau-of-statistics-economic-survey-2017/ accessed on 03/07/2019
[10]Government of Kenya, Implementation of the Agenda 2030, for sustainable development in Kenya, (Ministry of Devolution and Planning, 2017)

make cities smart, resilient and green but also technology to protect people in the rural from negative imminence of invisible and uncontrolled air pollution.[11]

The constitution of Kenya at Article 10 (2-d)[12] provides for sustainable development as a central principle of good governance. At Article 28 human dignity is proclaimed, while at Article 42, affirms the right to a clean and healthy environment. Further, at Articles 69 and 70 the Constitution gives rise to the obligation of state and citizens to ensure that environment, for which air is a fundamental component remains in a usable state.[13]

The constitution as intoned at Article 71 allows the legislators to enact enabling statutes for matters environmental.[14] In this regard, Kenya has Environmental Management and Coordination Act (EMCA) that has safe guards against air pollution was revised and amended in 2015. Section 78 of the EMCA indicates Cabinet Secretary's decision to set measurements for ambient quality standards based on advice of National Environment and Management Authority (NEMA), likewise establish criteria for appraising air quality, including directives on occupational air quality standards, besides develop standards and parameters for air pollution control from mobile and stationery sources. It is further given at section 78, subsection 1, c-e, that the cabinet secretary has the responsibility to undertake actions that reduce air pollution, including prescription for new technology to scale down greenhouse gas emissions among other initiatives manifesting as monitoring, besides controlling pollution.[15]

[11]United Nations, Air Pollution and Sustainable Development Goals, (2019), https://www.worldenvironmentday.global/did-you-know/air-pollution-and-sustainable-development-goals, accessed on 28/06/2019
[12]Constitution, Article 10 (2-d)
[13]Ibid, Articles, 28, 42, 69 and 70.
[14]Ibid, Art. 71
[15]Government of Kenya, EMCA, (Kenya Law Reporting, 2015), http://www.kenyalaw.org/lex/actview.xql?actid=No.%208%20of%201999, accessed on 28/06/2019

Furthermore, Kenya has a National Environmental Policy which among other provisions sounds out the need for clean air. The NEP emphasizes a strategy for industrial development that protects the environment, while promoting the harmony of development and ecological policies, hence allows for the enhancement and subsequent transfer of environmentally sound technologies.[16] At section 6.1 of the NEP air pollution has been identified as one retrogressive and undermining factor on likely achievement envisaged by Vision 2030 framework, due to the various linkages that pollution has to ill-health and low rate among rural and poor communities to revert to alternative cooking fuels away from biomass and kerosene. NEP envisages government with strong institutions to guarantee compliance and effective enforcement. Equally, the government is duty bound to sponsor effective active and human powered transportation, plus efficient mass transport system which is less polluting, including claim to support modes of transport and cooking stoves that bereave the country of pollution.[17]

Air Quality Regulations are in place since 2014. Section 3 commits to ensure that air quality is maintained thus deliberate actions to deflate any air pollution by prevention, control and abatement.[18] These regulations give NEMA a wide mandate on the management of air, similarly gives it duty to coordinate other related sectors for purposes of reducing and preventing air pollution.[19]

Despite all these laws, policies, programs and institutions in the management of clean air, allegations of pollution are sustained.[20]As a country, it has been difficult to maintain permissible Particulate Matter (PM) in the air at levels above $PM_{2.5}$ and PM_{10}. Poor health,

[16]Government of Kenya, National Environmental Policy (2013), at section 5.5.1
[17]Ibid at pp 37-38
[18]Government of Kenya, The Environmental Management and Co-Ordination Air Quality Regulations, (2014)
[19]Ibid
[20] UN Environment, Air pollution hurts the poorest most, (09 May 2019) https://www.unenvironment.org/news-and-stories/story/air-pollution-hurts-poorest-most, accessed on 06 June 2019

premature and unnecessary deaths among infants continue being reported[21] and an increase in chronic diseases such as asthma and cancer,[22] to the extent the WHO has declared air pollution as the most lethal killer.[23] The developing world for which Kenya is part, air pollution is 10 times higher and the cost of health problem is 15 times more than the developed world. This is because the noxious gases, smoke particles and chemicals which make up the destructive fine particulate have increased in magnitude.[24]

Arguments by authors such as Benjamin Barczewski[25] and International Network for Environmental Compliance and Enforcement[26] canvass excessive air pollution caused by poor political leadership to support regulations, compliance levels and effective implementation law and policy, notwithstanding absence of optimum financial and technical capacity to address it.[27]

Concerns raised in Kenya about development that is less keen to air pollution are similar to those around the world. Increasingly demand for pre-emptive environmental models and principles such as precaution, prevention, polluter-pays and common but differentiated responsibility including several aspects (forms) of Environmental Impact Assessments be used in ways that protect people and their environments from adverse effects of development. The Brundtland Commission report of 1987 set a foundation to adopt and promote sustainable

[21]Ikenna, C. Eze and others, Long-term air pollution exposure and diabetes in a population-based Swiss cohort, (2014) Vol 70 Environmental international 95
[22]World Health Organization, Actions Air Quality Report (2016)
[23]Chi-Hao Tsai, et al, The inhibition of lung cancer cell migration by AhR-regulated autophagy, (Nature.com reports, 2017), https://www.nature.com/articles/srep41927, accessed on 15 November 2017
[24]COP 2015, Paris
[25]Benjamin Barczewski, How Well Do Environmental Regulations Work in Kenya: A Case Study of the Thika Highway Improvement Project, (University of Nairobi & Center for sustainable development, 2013), http://csud.ei.columbia.edu/files/2013/10/Irandu_reportFinal.pdf, accessed on 13 April 2019
[26]International Network for Environmental Compliance and Enforcement (INECE), Principles of Environmental Compliance and Enforcement Handbook (2009), http://www.inece.org/principles/, accessed on 08 May 2018
[27]Allan Andrews, The right to breath clean air (2018) www.unenvironment.org/new-and-stories/story/right-breathe-clean-air, accessed on 18 March 2019

development.[28]If juxtaposed against the Stockholm Declaration, then it gives rise to man's right to enjoy freedom, and adequate qualities of life in an environment where dignity and safety flourishes.[29]

Different approaches consisting of modern technologies, efficient and incentive driven methods of production have been tried to safe guard air from pollution. In Kenya, under the EMCA and other attendant laws point to different approaches to deal with air pollution. The question that tends to crop up is whether, the country is has foundational and functional infrastructure to run a multicity of interventions to achieve clean air management. Alongside such multiplicity is the need to have reliable information and data as regards air pollution, which calls for the installation of sophisticated equipment and related machinery. It has been mentioned that the cost of the infrastructure to enable collection of such data is humongous and the country cannot afford.[30]

Similarly, in some jurisdictions exemplified by United State of America (US) and United Kingdom (UK) different approaches have been employed. This is an appreciation that development is necessary just as clean air.[31] However, where there has been sloppiness in government to protect the air from pollution, independent groups and individuals have always sought the intervention of the court. Such land mark case with regard to transboundary air

[28]This report set defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs"
[29]Stockholm declaration of the United Nations Conference on the human environment (1973), UN Doc A/CONF.48/14/. Rev. 1 at 3
[30]Piere Faillier, Patrick Karani and Wondwosen Seide, Assessment of the Environment Pollution and its impact on Economic Cooperation and Integration Initiatives of the IGAD Region; National Environment Pollution, Assessment of the Environment Pollution and its impact on Economic Cooperation and Integration Initiatives of the IGAD Region National Environment Pollution Report - Uganda, http://.researchgate.net/publication/299442409 accessed on 10 April 2019
[31]Subhra Bhattacharjee and Usman Ali Iftikhar, Greening Human Development: Capturing Wins in Equity and Environmental Sustainability Report, (UNDP, 2011)

pollution is the Trail Smelter case,[32] filed by the US seeking damages from Canada and also prayed from the arbitral tribunal an injunction for air pollution in the state of Washington by Trail Smelter which was a Canadian Corporation. The tribunal awarded the prayers citing it one state's responsibility to protect neighbouring and other states from the irresponsible acts of pollution from within its jurisdiction.

Litigation seem to be a growing and preferable approach to reduce air pollution in many jurisdictions. A case in point filed by Deutsche Umwelthilfe against the cities of Stuttgart and Dusseldorf and determined in Leipzig administrative court in Germany, passed a judgement to force the cities to act against the toxic nitrogen and fine particles emitted by older diesel engines. The court Leipzig, held that the administration of those cities had duty to protect citizens from air pollution.[33]

1.2 Statement of the Problem

Clean and breathable air is central in the sustenance of quality of life among animals, people and plants in Kenya. However, there are indications that air is considerably polluted based on the levels of particulate matter (PM)[34] in the air that are less than PM2.5 and PM10. Evidence suggests that most of Kenya's urban centres have very high fine particulate matter (PM) of less than 2.5 millimeter(s), that is associated with low quality ambient air, while the rural regions are greatly affected by indoor pollution that originates from high reliability on biomass for cooking. The WHO) and United Nations Environmental Program (UNEP) Reports[35] of 2016

[32]Arbitral Trib., 3 U.N. Rep. Int'l Arb. Awards 1905 (1941)
[33]The CNN news, German court rules cities can ban diesel cars to tackle pollution, (2018, 28, February)
[34] See definition offered by, https://www.epa.gov/pm-pollution/particulate-matter-pm-basics,
PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.
[35] Kenya Air quality catalogue (2019), https://wedocs.unep.org/bitstream/handle/20.500.11822/17228/Kenya.pdf?sequence=1&isAllowed=y, accessed on the 03/07/2019

and 2017 respectively show, for instance that Nairobi air is in a state that offends all World Health Organization standards, pointing to prevalence of air pollution in many of the urban centres due to high concentration of industries and motor traffic. Nonetheless, records show that an average of 14,300 people die in Nairobi alone in any given year. Measured against the global trends, it contributes to the 35% of the deaths experienced worldwide from air pollution. Besides there are considerable statistics to indict air pollution for various respiratory illnesses as it is identified as the fourth important risk factor ballooning the cost of health in Kenya. This is so despite a generally robust legal and policy framework with constitutional and statutory provisions which speak to the sanity of air within the frames of environmental governance. Similarly, there are institutions legally mandated to control air pollution at national and county levels. Based on this background, this research interrogates the reasons as to why air pollution is seemingly an expanding problem in the country.

1.3 Overall objective

The overall objective of the research is to investigate why the quality of air seems to be deteriorating in spite of the existing legal, policy and institutional infrastructure to address real and potential air pollution as envisaged at Article 42[36]and schedule IV of the Constitution.

1.4 Specific objectives:

a) To examine which environmental legislation in Kenya guarantees the right to clean breathable air.
b) Assess whether the institutional framework is structured to promote clean air in Kenya
c) To review the responsiveness of the existing air pollution control mechanisms in Kenya

1.5 Research Question(s)

This study is anchored on the following research questions:

[36] Article 42

a) To what extent does environmental legislation in Kenya guarantee the right to quality breathable air?
b) Does the existing institutional infrastructure promote non-proliferation of contaminated air in Kenya?
c) How responsive are the existing air pollution control mechanisms in Kenya?

1.6 Justification of the study

The findings of this research provide a body of knowledge that draws the understanding on why air pollution persists yet laws and policies have created air pollution control institutions, with a view to help the Senate (Senate because it is in-charge of county governance, which emanate from the fact that function of protecting people from air pollution is devolved) come up with a responsive policy reform proposal to actualize schedule IV and Article 42 of the Constitution. The study explores links between NEMA, which is a national body and County Governments whose mandate concerning clean air is found at schedule IV of the constitution. Further, the study identifies new areas of research.

1.7 Hypothesis of the study

Poor standards of air in Kenya are as a result of factors that impede the responsiveness of the legal and institutional infrastructure

1.8 Theoretical framework

1.8.1 Introduction

Prosperity and environment are intertwined and often seem contradictory. The need for development is as necessary as that of air from pollution. As demonstrated by the director of United Nations Environmental Program (UNEP), air requires every effort to protect it from blatant abuse.

"For too long, the relationship between prosperity and environment has been seen as a trade-off. Tackling pollution was equated to imposing costs on industry and curbing economic growth. Global trends are demonstrating that this is no longer the case. Increasingly, for anyone concerned about prosperity and the welfare of current and future generations, it has become clear that sustainable development is the only form of development that makes sense, including in financial and economic terms. Investing in green technologies is a strategy for long term profitability and prosperity for all."[37]

Therefore, this research is guided by sustainable development theory, which justifies the middle ground between development and health air conditions. In diagnosing the import of clean air, the debate about pollution must be juxtaposed alongside development, because the nexus is real. On the other hand right to development is provided by the United Nations Declaration A/RES/41/128 of 1986.[38] Similarly the right to a clean and healthy environment is internationally recognized in law and treaties such as the Stockholm declaration,[39] the Kyoto protocol[40] and national statutes.[41] Both sets of rights aim to ensure that people engage gainfully in economic, social, cultural and political progression of their countries.[42] Reading from the various international platforms including the Paris conference on climate change there is the uncontested relationship between development and air pollution.

[37]UNEP Executive Director's report, Towards a pollution free planet, (UNEP, 2017)
[38] United Nations, Declaration on the right to development, A/RES/41/128 (2018) www.un.org/documents/ga/res/41/a41r128.htm, accessed on 4 April 2018
[39] United Nations, Declaration of the United Nations Conference on the Human environment (2018), www.un-documents.net/unchedec.htm, accessed on 4 April 2018
[40]UN Chronicle, From Stockholm to Kyoto: A brief history of Climate Change, (2007) www.unchronicles.un.org/article/stockholm-Kyoto-brief-history-climate-change, accessed on 10 August 2018
[41]Constitution (n 36).
[42] UN, (n 38).

1.8.2 The Theory of Sustainable Development (TSD)

Concept of Sustainable development theory creates an agreeable interphase between development and protection of air from pollution. Sustainable development theory is resident to several principles applied to maintain environmental sanity that include Polluter-pays, precautionary principle and inter-generational equity amongst others.[43]The theory is fundamental in drawing lessons in the global market on how development and environment have found and require a balance. As observed by writers such as Jenifer Elliot, sustainable development may not yield similar outcomes in many jurisdictions; but the essential principles do not change. This makes it universally usable in most cases.[44]

Sustainable development as inscribed in Sustainable Development Goals (SDGs) Framework stands out as a strategy to promote the interests of people, planet and prosperity.[45] In many of its goals, like eradication of poverty, doubling of agricultural productivity and recognition of expanded freedoms for the people, the environment dialogue remains pivotal. Consequently, TSD sets stage to investigate the relevance of existing laws and policies in the quest to control air pollution. Particularly identifying provisions deliberately coined to guard against air pollution. Further, TSD is platform from which institutional framework is examined to find out if the construction of environmental management institutions can promote integrity of air. This school of thought gets support from environmental experts such as Rachel Elmas[46]who among other positive issues claim that sustainable development gives prominence to the integration of relevant policy structures into managerial practices of institutions.

[43]Stoddart, H., A Pocket guide to sustainable development governance, (Commonwealth Secretariat Stakeholder Forum, 2011).
[44]Jenifer Elliot, An Introduction to sustainable development, (3rd Edition, Routledge, 2006)
[45]United Nations, Sustainable Development Goals, (United Nations, 2016)
[46]Rachel Emas, The Concept of Sustainable Development: Definition and Defining Principles, (Brief for GSDR 2015)

However, this sometimes can be defeated institutionally. As Brodhag cautions, government organizations are bureaucratic, structured with ministries and departments, which may fail to remain effective when integrating concepts and models of development that deviate from the norm of doing things such as sustainable development. In other words, the nature of government operations takes a while before aligning to systemic and thematic reforms.[47] The most appropriate path is to reduce fragmentation, and integrate decision making that models socially and economically with less harm to the environment in order to achieve holistic development.

In support of the aforementioned assertion are Michael Porter and Claas Van der Linde who argued that air pollution is an end result of bad use of resources. Nevertheless, it is strategic to balance the environment and economy to control air pollution by way of cultivating less polluting production processes. Therefore, in contextualizing the provisions of the Rio and Stockholm declaration particularly principles 4,[48] 15,[49] 16[50] and 25[51] of the former as well as principle 13[52] of the latter, the researcher places emphasis on the balance necessary to reduce air pollution in the face of developing economies. The argument by Porter and Van der Linde is that innovative modus operandi reduces opportunistic and deliberate air pollution points.

[47]Brodhag, C., &Taliere, S, Sustainable development strategies: Tools for policy coherence, (2006) Natural Resources Forum, 136

[48] Principle 4 of the Rio declaration states, "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it."

[49] Principle 15 states; "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

[50]Principle 16 states; "National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment."

[51] Principle 25 states; "Peace, development and environmental protection are interdependent and indivisible."

[52]Principle 13 states "In order to achieve a more rational management of resources and thus to improve the environment, States should adopt an integrated and coordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve environment for the benefit of their population."

However, it must be accompanied by a culture of compliance to environmental rules is it is purposed to enhance competitiveness."

We have commentators who hold the view that over emphasis on sustainable development leaves industrial developers and investors with a narrow navigation path to undertake investments. The strictness of TSD to the extent of curtailing science to generate relevant measures may be detrimental in the long run. Furthermore, criticism is abundant that sustainable development has not lessened environmental challenges prevalent in the developing world. In fact others have criticized sustainable development as condemning developing world to poverty, inequality and substance existence.[53]

However, sustainable development is highly recognized in Kenya. Under the constitution, Article ten (10), sustainable development is cited among national values.[54] This makes it a sacrosanct imposition on the way development and governance is carried out in the country. Upon the pillars that define sustainable development in the confines of Brundtland report,[55]the researcher is keen to understand the extent to which breathable air is sufficient for today's generation without threatening the place of future generations.

1.9 Research Methodology

In the words of Jayanta Nayak,[56] research can be looked at as an art of scientific investigation. In order to bring out a careful investigation of the subject under study the researcher carried

[53]Ronald Bailey, Listening to the Poor: What Western environmentalists could learn from real poor, (2002), http://reason.com/archives/2002/08/27/listening-to-the-poor, accessed on 06/05/2018
[54]Constitution (n 38) Art. 10
[55]United Nations, The Brundtland report (2018) https://www.are.admin.ch/are/en/home/sustainable-development/international-cooperation/2030agenda/un-_-milestones-in-sustainable-development/1987--brundtland-report.html, accessed on 26 March 2018
[56]Jayanta Nayak and Priyanka Singh, Fundamentals of research methodology: Problems and prospects, (SSDN Publishers, 2015)

out a desk study employing both doctrinal and analytical legal approaches. The researcher collected secondary data focusing on environmental management practices that defeat and reduce air pollution. Particularly the study gained from a) Constitution of Kenya; b) The various international treaties and conventions including the Stockholm and Rio Declarations; c) The Air Pollution Regulations in Kenya (2014); the National Environmental Management Policy of Kenya (2015); d) The Environmental and Management Coordination Act (reviewed in 2015). In bringing out how legislations and policies are applied, the study further interrogated, reviewed and critiqued: a) relevant articles accessed in scientific journals b) newspaper write ups on air pollution and environmental management; c) scientific discussions, debates and documentaries shared on thematic and public electronic media such as TV and Internet; d) case materials from environmental courts particularly those within the commonwealth framework owing shared historical developments.

1.10 Literature Review

1.10.1 Introduction to literature review

This section deals with domestic and international legal instruments, as well as textbooks and scholarly articles relevant to this study. In analyzing these materials, the study identifies some gaps emerging from the literature reviewed, which this study seeks to fill.

1.10.2 Infrastructure for clean air in Kenya

Primarily this study examines and critically appraises the legal and institutional framework against air pollution. The study finds out why air pollution seems to be on the rise, yet there exist laws, policies and regulations alongside institutions legally mandated to ensure the state of clean air in Kenya. Further, the study establishes how air pollution can be addressed with regard to devolved functions within the devolved governance system, reading from the fourth

schedule of the constitution pursuant to Article 174 under the objects of devolution.[57]More so, the study underpins the mandate of NEMA to guard the country from air pollution. Air pollution being such a sophisticated component of the environment, the study interrogates the air pollution control interventions carried out by several state and nonstate actors that originate from the robustness or leanness of the legal and policy framework.

Studies carried out by Opondo Keya and Eunice Omanga indicate that many developing countries suffer from legal and systemic inadequacies, which in turn creates difficulties to manage air pollution. Similarly, they point a finger at the state for failing to rein on air polluters for fear of antagonizing economic development. This systemic failure has compromised compliance and enforcement especially when potential polluters bereave themselves of relevant technology. The other repercussion of this kind of scenario is the absence of air pollution data, which then creates a false impression no pollution at all or less.[58]

There are many approaches in dealing with air pollution. A study from New Zealand by Thornton D, suggests that most jurisdictions lean towards effects-oriented approaches that hedge off environmental impacts. While such schemes have served well the populations of New Zealand, the aspect that the regulation permits emitters an opportunity to decide how to minimize and mitigate impacts of air pollution tends to reduce its efficacy.[59] This is based on the fact that time plays a significant factor in determining when air pollution has affected a good number of people.

[57] Ibid, (n 38) Art. 174

[58]Eunice Omanga, Lisa Ulmer, Zekaria Berhane and Michael Gatari, Industrial air pollution in rural Kenya: community awareness, risk perception and associations between risk variables, (2014), 14 BMC, 377, see also Opondo Keyah, Analysis of the governance framework for vehicular air pollution abatement in Kenya: A case study of Nairobi city, (University of Nairobi, 2017)

[59]Sturman, A.P. &Zawar-Reza, P. The Role of Atmospheric Modelling in the implementation of new National Environmental Standards for Air Quality in New Zealand, Centre for Atmospheric Research, (University of Canterbury, Christchurch 2005)., New Zealand.

Birgen Jael argues for cautious laden self-regulation process on air pollution. In her study she cautions that self-regulation works best where institutions of governance are strict on policy, besides clear guide on standards that promote clean air. In this study she reveals that self-regulation has not been effective in Kenya due to institutional constraints from NEMA, particularly its lack of capacity to monitor set standards and performance rates, as prescribed by Air Quality Regulations.[60]

There is growing recognition and consensus on the critical role of the judiciary in actualizing the rule of law, in particular interpretation and promotion of enforcement. In fact, emphasis is on development of expertise among judges and prosecutors in environmental matters to achieve ecologically viable development.[61] Therefore, court's presence is fundamental as an adjudicator of disputes but importantly an enabler of compliance and enforcement with regard to air pollution. Despite the fundamentality, bottlenecks exist that reduces its effectiveness such as: a) lack of environmental case load, notwithstanding air pollution in the country: b) large part of the population not having enough and expert information on air pollution: c) the profiling of the ELC as dealing with more land matters rather environmental disputes: and d) low legitimacy among the public that the court seeks to serve, owing to historical baggage based on accusations of corruption and absence of professionalism among judicial staff. As indicated by Angote Oscar in his study on effectiveness of environment courts and tribunals, very little data has been documented on environmental matters handled by the ELC in Kenya since establishment in 2012.[62]

[60]Jael Birgen, Assessment of levels of selected air pollutants in Athi River, Kenya, (University of Nairobi, 2017)
[61] Brian J. Preston, Benefits of Judicial Specialization in Environmental Law: The Land and Environment Court of New South Wales as a Case Study, (2012), Vol 29 Pace Environmental Law Review. 396
[62]Angote Oscar, The role of the environment and land courts in enforcing environmental law: A critical analysis of the environmental caseload, (University of Nairobi, 2018)

However, some other studies have suggested a tweak to self-governance. Their argument has been that one cannot be the offender and remain the custodian of what the offense is all about. They have also decried the concept of giving industries and vehicles a platform to carry out "only meaningful pollution." Some of these writers including and not limited to Yu Xiao have even propelled the idea that self-regulation measured against profit margins defeats the subject of sustainable development. Such studies have condemned self-regulation and criticized the reluctance of many governments from implementing relevant legal and policy directions to improve quality of breathable air.[63]

There are claims that research has not consistently focused on determination of why air is contaminated in especially considering the efficacy of the legal and policy framework. According to Kanyiva Muindi, this poses a problem in the context that people outside the thematic sector of air management then lack authoritative voice in raising concerns, for absence of relevant literature to support certain positions. In addition, there is limited and scanty data showing magnitude and effect of air pollution in Kenya. This makes it difficult to inform or reform policy.[64]Therefore this study rides on these concerns and looks at a review that collects evidence to inform practice.

Nevertheless, practical sectoral interventions have been tried though not consistently across different sectors. In the energy sector a number of initiatives have thrived though for short periods till 2016, when the Green Energy Strategy Implementation Plan was mooted.[65]Previously, attempts have been made to increase access to clean energy by rural

[63]Yu Xiao, The Experience to Abate Air Pollution - What Lessons can Beijing, China Draw from Developed Countries When Trying to Reduce Emissions? (Uppsala University, 2015)
[64]Kanyiva Muindi, Air Pollution in Nairobi Slums: Sources, Levels and Lay Perceptions, (Umea University Sweden, 2017)
[65]Honnon Kosgey, Green energy strategies and United Nations Sustainable Development Goal on affordable clean energy at Kenya Electricity Generating Company Limited, (University of Nairobi, 2017)

communities and communities settled in slums to reduce use of biomass as fuel. In some areas efficient cook stoves (improved cook stoves) have been employed for efficient burning of biomass, while solar and wind powered lanterns for lighting. Therefore, green energy technologies are an opportunity to increase affordable lighting, cooking and energy, hence creating disinterest in fossil fuels. These processes albeit constricting air pollution in the households have only been intermittent because their functionality is donor oriented and not anchored in deliberate state plans.[66]

There has been a general endeavour to green the economy, especially focusing on energy, water and industrial technological advancement in which Kenya's manufacturing sector has been part of the solutions to addressing air pollution.[67] There exist initiatives to green industrial parks in the country. In 2018 under the Green Climate Fund, Kenya was funded for a low carbon and climate resilient industrial development project in a bid to deregister the linear model of industrialization. The efforts focus on mobilization of resources to introduce and scale up industrial symbiosis and environmentally sound technologies, including practices in existing and emerging industrial zones.[68]

The Green Economy Strategy and Implementation Plan (GESIP) in the ambit of vision 2030 tries to fortify the country from irresponsible development and consumption behaviour. The GESIP offers principles besides the polluter-pays to drive the economy through a path of

[66] UNDP, Access to clean energy in rural Kenya through innovative market-based solutions, the low emission capacity building programme, (UNDP, 2016)

[67] Akinyi Kaudia, Chaofeng Yang and Bok Hwan Yu, Green growth as national project in China, Kenya and Korea, Development cooperation report, (OECD, 2012,).

[68] Green Climate Fund, Greening Kenya Industrial Zones: stimulating competitiveness and investments in the face of resource scarcity and climate change, (2018), https://www.greenclimate.fund/documents/20182/893456/18050_-_Greening_Kenya_Industrial_Zones__stimulating_competitiveness_and_investments_in_the_face_of_resource_scarcity_and_climate_change.pdf/c06af432-56ac-43a6-a0f5-4b522527abc3, accessed on 07/09/2019

inclusive and balanced development as envisaged by the constitution. GESIP is the strategy through which Kenya seeks to harness many of the interventions on air pollution control. The target sectors include improved technologies within manufacturing and production lines. Further, align the country to consumption styles and patterns that rely less on non-renewable energies.[69]

Research is also another area that is quickly gaining traction with regard to air pollution control. Tertiary institutions in the likes of University of Nairobi has partnered with both local and international partners to carry out research with a view to reduce opportunities for ungovernable air pollution. For instance, a study undertaken in conjunction with GEOHealth Hub based at the University of South California to establish air pollution and monitor the impact to the surroundings commenced in June 2019.[70] Internally National Environment and Management Authority (NEMA) claims to have put in place mechanism to ensure Environment Impact Assessment(s) are carried out. Some of the investments where EIAs have been carried out include construction of small-scale liquefied petroleum gas import and storage terminal in the port of Mombasa.[71]

As counties take the responsibility to undertake air pollution control, some have demonstrated the desire by establishing basic legal and policy directions being an improvement of by-laws inherited from the former local government portfolio on the commencement of devolution.

[69] Government of Kenya, Green energy strategy and implementation plan, 2016-2030, A low carbon, resource efficient, equitable and inclusive socio-economic transformation, (Ministry of Environment and natural resources, 2016)

[70]University of Nairobi, Research on impact of air pollution on school going children in Nairobi county, (University of Nairobi, February, 2019) https://www.uonbi.ac.ke/content/uon-researchers-undertake-air-quality-monitoring-nairobi, Accessed 12 June 2019

[71]Mansa East Africa Limited, Environmental Impact Assessment Report with regard to the construction of a small-scale liquefied gas and petroleum plant in Mombasa port, (Tropospace, consultancy, July 2018).

Several counties such as Makueni, Turkana,[72] Nairobi and Kisumu have enacted environmental laws and policies that are deliberate and elaborate on air pollution control. Others such as Nairobi have banned open burning of garbage and has recommended adoption to incinerators. Mombasa and Nairobi are quickly seeking decongestion strategies which include adoption of non-motorized mechanisms being encouraged.[73] Essentially this has meant an improved security system, to guarantee free movement of people who most walk to work.

The foregoing literature is an opportunity for the researcher to develop thematic knowledge on some of the following. First, is whether, constitutional provisions at Article 42, 43 and schedule IV are achievable with regard to air pollution control. Secondly concerns are rife whether the national government through NEMA and County governments have structures that address air pollution comprehensively. Thirdly, is to understand if air pollution control measures have any impact, which includes drawing lessons to improve them where necessary.

1.11 Limitations of the study

The researcher limits discussions and literature review to the Kenyan Constitutional provisions for environmental protection, the Environmental Coordination and management Act and Air pollution regulations. Nonetheless, the researcher also reviews a few other attendant laws, if applied could de-escalate air pollution among them Climate change Act. The researcher mentions other jurisdictions especially the United Kingdom and Germany emphasizing comparative learning on the approaches on control. To ascertain the impact of air pollution

[72]County Government of Turkana, The Turkana county environment regulation bill (2018), https://turkana.go.ke/wp-content/uploads/2019/02/Draft-Turkana-County-Environment-Bill-2019-1.pdf, accessed on 07/09/2019

[73]SEI, City plan for cleaner air and better health plan (24 June 2018), https://www.sei.org/featured/cleaner-city-air-better-health/, accessed on 08 September 2019

control measures the researcher strokes the implementation plans as rolled out by institutions charged with the air pollution control in Kenya. As the topic suggests, the researcher only seeks to identify areas that can be improved to strengthen air pollution control in the country.

1.12 Chapter breakdown

Chapter one introduces the research topic and provides an outline that canvass the state of environment in Kenya. The chapter brings out air pollutions' impact and potential effects in the country, highlighting this phenomenon in a dual scope of indoor and outdoor pollution. The chapter contextualizes the dialogue on air pollution by reviewing literature touching urbanization especially impact of rapid industrialization as well as indoor pollution emphasizing overreliance on biomass by interrogating the laws and policies, similarly drawing understanding on effectiveness of public institutions with legal mandate to address air pollution. Moreover, the chapter identifies legal issues of concern and discusses them within a theoretical framework, in a way that demonstrates the importance of the reviewed literature.

Chapter two reviews the environmental policies and laws with regard to clean air management in the country alongside the relevant institutions with mandate for air pollution control. Specifically, reviews the role of National Environment and Management Authority (NEMA) among other attendant institutions indirectly addressing air pollution in Kenya like National Road Safety Authority (NTSA), National Police Service (NPS), Nuclear Power and Energy Agency (NUPEA) and Rural Electrification and Renewable Energy Corporation (REREC). This review is in a legal set up of the constitution of Kenya, the Environment Management and Coordination Act, Air Quality Regulations Energy Act, NTSA Act and the Traffic Act amongst other select county laws. Through this chapter the researcher tries to draw relevance of these frameworks within a development discourse that is informed by high sophistication and modern technology.

Chapter three assesses the preventive and curative mechanisms to deal with air pollution. The chapter particularly reviews the impact of applying multiplicity of interventions especially those directed at reducing emissions from both indoor and outdoor sources, initiatives to decongest urban centers and efforts taken to integrate air pollution averse technology and equipment.

Chapter four consolidates the reviews made in the three previous chapters. In particular the chapter extends critical arguments on appropriateness of laws, polices, institutions and control measures which leads to evidence-based conclusions and recommendations. Based on the discussions, the study validates the hypothesis made at the beginning of the study, that poor standards of air in Kenya is as a result of factors that impede the responsiveness of the legal and institutional infrastructure.

Chapter Two: Legal, Policy and Institutional Framework for Air Pollution Control

In this chapter, the researcher interrogates the extent to which environmental legislation in Kenya guarantee the right to clean and healthy air. Therefore, a review of the existing legal infrastructure emphasizing national and county laws, policies and regulations, including an understanding of the institutional scheme as a means to establish the degree of responsiveness in air pollution control.

2.1 Introduction

Kenya becoming middle level economy is anchored on vision 2030 which builds up on fifty five years history of consistent urbanization and industrial,[1] which points to the competition between ecological balance and human development in Kenya.[2] Aggressive rural- urban migration and rapidly growing population measured against lean basic service infrastructure postures the magnitude of pollution in many urban centres and cities.[3] Cities and upcoming towns like Nairobi, Mombasa and Kisumu have higher levels of polluted air based on emissions measured in metric tonnes from different sectors as follows: industrial sources at 2.1: transportation at 6.1: forestry sources at 19.1: and demand for energy at 9.1.[4] In fact, United Nations Environmental Program has warned that not unless effective remedial measures are taken, breathable air will continue dwindling.

[1]Shilenje Zablon et al, Roadside air pollutants along elected roads in Nairobi City, Kenya, (2016) Vol 5 Geol Geophys 5

[2] Government of Kenya, Kenya's Vision 2030: A globally competitive and prosperous Kenya, found on https://www.researchictafrica.net/countries/kenya/Kenya_Vision_2030_-_2007.pdf, accessed on 05/07/2019

[3] Migration, urbanization and environment in Kenya, Policy Brief No. 4 of the National Coordinating agency for population and development, found on http://www.ncpd.go.ke/wp-content/uploads/2016/11/Policy-Brief-4-Migration-Urbanization-and-Environment-in-Kenya-1.pdf, accessed on 05/07/2019

[4] Geoffrey Wahungu, Improving air quality in Kenya, a presentation for the Director General of National Environment and Management Authority, found on https://wedocs.unep.org/bitstream/handle/20.500.11822/16820/improving_airquality.pdf?sequence=1&isAllowed=y, access on 05/07/2019

With the aforementioned background, this chapter reviews the existing legal and policy framework regarding air pollution in the larger environmental governance space. Particularly, the researcher pays attention to the provisions within the Constitution considered foundational to other statutes such as the Energy Act (EA), Environment Management and Coordination Act (EMCA), National environmental policy of 2013 and Air Quality Regulations amongst others. This chapter seeks to demonstrate the effectiveness of the legal, policy and institutional schemes in bereaving Kenya's urban centres of acute air pollution.

2.2 The Constitution of Kenya

The Constitution postulates a general duty bearer and right holder road map on each sector and service in the country. At Article 10 (1), it[5] stipulates the national values, which bind each and every person, wherever they are an in whatever they do. The article goes further to give prominence to effective institutional culture and value of governance. Specifically, at sub-article (1-a), it highlights the essence of devolution, rule of law and ordinary people's involvement: at (1-b), it addresses dignity of the person, importance of fairness, non-discrimination and purposeful protection of the marginalized in a general framework of human rights. at (1-c) it underscores probity in the form of good governance, integrity, transparency and accountability: lastly at (1-d) emphasizes the aspect of sustainable development.[6]

At article 26, the supreme law of the land offers right to life for each person and their dignity at Article 28, that must not be compromised. The constitution clear on the freedom to reside anywhere in the country as a rights at Article 39 (3) which state that "every citizen has the right to enter, remain in and reside anywhere in Kenya". However, the residence should be adequate

[5]Government of Kenya, The constitution, (KLR, 2010)
[6]Ibid

with good sanitation as captured at Article (43-1-b).[7] This is in pursuant to article 42 which directs that persons have the right to quality environment, which includes the right to; a) sustainably managed environment for now and future by various mechanism including laws and improvement of infrastructure, particularly envisioned in Article 69 and plus obligations fulfilled at Article 70.[8]

Contextualizing air pollution, Article 69 (1)-a), (d) and (f) directs the state towards ecologically- right use of the environment to include conservation, management and development, as well as formulating fair ways of distributing rewards from natural resources. Further, the state is obligated to involve citizens in the decision making processes concerning conservation and protection of environment, besides instituting mechanisms to assess, audit, monitor and review environment. These perspectives are ring fenced by provisions in sub-article 2 that binds each person in the Kenyan jurisdiction to the duty of taking care of the environment; the sub-article states "Every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources."[9]

The Constitution in schedule four (IV) in pursuant to Article 174[10] and 186[11] invites national and county governments in simultaneous control of air pollution.. Paragraph 22 in part one (I), assumes that national government agencies shields the environment and natural resources by facilitating renewable and less environmental harmful approaches of development. In

[7]Ibid
[8]Supra
[9]Article 69
[10] Republic of Kenya, The Constitution, (2010), Article 174, provides for the objects of devolution particularly at sub-article (a) which vouches for accountable and democratic exercise of power and at sub article (h), speaking to the centralization of state organs, their functions and services from the capital of Kenya.
[11]Ibid, at Article 186 (1) which states, except as otherwise provided by this constitution, the functions and powers of the national government and county governments respectively, are set out in the fourth schedule.

paragraph 10, part two (II), the Constitution demands of the counties to implement specific NR and environmental policies originating from the national government on conservation and protection. While in paragraph (3) of the same section, the Constitution bestows the county with direct responsibility to control air pollution.[12]

The constitution provides protection of the environment from harm and rests this on three pillars of environmental governance. Which include rule of law, effective governance based on right holder-duty bearer relationship and public participation. First, the constitution contemplates the adherence to law. In article 10 (2-a), it highlights the duality of adherence contextualized as a national value and as norm of effective governance. In envisioning the rule of law, the constitution proffers five important issues: a) the necessity and the presence of a legal and policy system to give life to the various provisions speaking to the optimal state of the environment: b) the place of compliance and enforcement of the legal and policy frameworks: c) the right to development: d) stakeholder consultation(s) and the concept of consensus building and the importance of remedial mechanisms when and if compliance is poor, which may include role of statutory authorities, tribunals and courts.

Therefore in a scheme of such thoughts, as posited by some scholars at the United Nations Institute of Training and Research, it is assumed that statutory institutions of governance will be established to facilitate effective and impartial enforcement of legal frameworks, while the judiciary and executive powers remain incorruptible.[13]In spite of the provisions in the constitution, there has been apprehension of corruption interfering realization of Article 70,

[12] Ibid, at Schedule IV it states "It states: "Control of air pollution, noise pollution, other public nuisances and outdoor advertising."

[13]United Nations Environmental Program, Introduction to environmental governance, (United Nations Institute of Training and Research, 2017)

which provides for court action by an individual who may allege likely or real abuse, violation or intrusion of the environment.

In contextualizing effective remedial mechanisms, the researcher observes that Kenya has established the Environment and Land Court (ELC) under the Environment and Land Court Act[14] as one mechanism to promote rule of law. However, in harmony with authors such as Norah Otieno, the extent to which the ELC is able to deal with air pollution has not been highlighted much because there exists no public data on matters taken before it for adjudication.[15]Such void created by lack of information on air pollution cases in court reduces development of jurisprudence, besides shuts the general public from fully appreciating the importance to enforce air pollution laws. One of the leading environmental legal minds, Collins Odote, does assert that ELC in the country have so far and largely handled land related disputes, partly because land issues formed the core of its establishment.[16]

The place of ELC is important if lessons from the holding of *Mbole Nzomo Anthony & 3 others versus Shreejii Enterprises Ltd & 4 others*,[17]guides this discussion. The High Court sitting in Mombasa, shied off from settling an air pollution matter, instead referred it back to the National

[14]Republic of Kenya, Environment and Land Court Act, No. 19 (2011) found on https://www.judiciary.go.ke/courts/environment-and-land-court/, accessed on 05/11/2019

[15] Norah Otieno, Appraising specialized environment courts in the attainment of environmental justice: the Kenyan experience, (University of Nairobi, 2014)

[16]Collins Odote, Environmental implications of the extractives sector in Kenya: Challenges and way forward, in *Drilling past the resources curse: Essays on the governance of extractive in Kenya*, "…The main goals for the establishment of specialized courts are largely two- fold. First is a result of case management imperatives. This focusses on improving the quantity and quality of case handling over that provided by general courts. The second imperative is that of jurisprudence. The motivation is to develop an alternative jurisprudence, one that expands from the traditional 'legalistic' adjudications to a 'problem solving', 'therapeutic' or 'interdisciplinary' approach.[45] Consequently, environmental courts and tribunals 'are looked to as one solution for fairly and transparently balancing the conflicts between protecting the environment and promoting development; for managing cases more efficiently and effectively…." (Strathmore University Press, 2018), p 176-177, para 3

[17] Civil Suit No.265 of 2010

Environmental Tribunal (NET) on two technicalities. In this matter the plaintiff sought injunction on alleging that the respondent was to continue constructing a manufacturing plant for sodium silicate in a heavily populated residential area, yet it was poisonous to humans by the inhale of Sulphur dioxide. The honorable court held that: a) the likely discharge with potential to harm the environment from a plant that processes sodium silicate domiciled at Miritini was a subject first to be handled by NET, only on appeal should the High court be moved:: and b) the environmental harm alleged was likely complex not deserving routine injunctions, especially the absence of knowledge-bases best reviewed by an expert institution, a state that the court had not capacity to determine the real situation on the affected ground.[18] While the grounds employed to reject the prayers of the plaintiff were valid legal points, at least on the interim the High Court should have issued some injunction to demonstrate the seriousness of the allegations made on air pollution alongside health concerns, inviting Article 70 (2-a),[19]for it to make orders to prevent or discontinue actions that may harm the environment and Article 22 (3-b) of the constitution,[20]that discourages reliance on technicalities to defeat actualization of the Bill of rights.

Second, the constitution at Article 69 (1-f) infers effectiveness and efficiency of institutions mandated to control air pollution. The constitution foresees the presence of institutions which are, by their very own establishment or existence required to carry out both anthropocentric and eco-centric functions that caters for people's welfare without defeating the health and rights

[18]See judgement on *Mbole Nzomo Anthony & 3 others versus Shreejii Enterprises Ltd & 4 others*,found on http://kenyaliisync.africanlii.org/za/judgment/high-court-mombasa/2011-40, accessed on 05/07/2019

[19]Republic of Kenya, Article 70 (2-a) (The Constitution of Kenya, 2010), states; "…to prevent, stop or discontinue any act of omission that is harmful to the environment."

[20] Ibid at Article 22 (3-b), (The Constitution of Kenya, 2010), states thus; "Every person has a right to institute court proceedings claiming that a right of fundamental freedom in the bill of rights has been denied, violated or infringed or is threatened, (3-b), The chief Justice shall make rules providing for the court proceedings referred to in this Article, which shall satisfy the criteria that: - formalities relating to the proceedings, including commencement of the proceedings, are kept to the minimum, and in particular that the court shall, if necessary, entertain proceedings on the basis of informal documentation"

of the environment as an independent entity.[21]In coalescing this position, the constitution at Article 10 (2-d) cites sustainable development which is dichotomous, as of people and planet as a principle of good governance.

In the aforementioned scenario the constitution must have envisaged a well-coordinated and efficiently run referral system between and across institutions. This can is referenced at Article 10 (2-a) where devolution and sharing of power is provided for. Similar to schedule IV part I regulation 22[22] and part II regulation 3.[23] This scenario creates a relationship where national government is a principle while counties are agents, in terms of implementing national policy. Besides, it empowers counties to run their own independent affairs in regard to air pollution. However, this faces limitation as anticipated under Article 186 (2), which states that "a function or power that is conferred on more than one level of government is a function or power within the concurrent jurisdiction of each of those levels of government."

Third, the constitution brings to fore the concept of stakeholder engagement where the environment which is inclusive of air comes through as a project that consolidates rights and addresses interests of diverse groups. This can be equated to collective ownership and consensus-oriented approaches of governance. There are provisions indicating that the environment is not a preserve of an individual, particularly the state. This gives effect to Schedule IV paragraph 22, article 69 (2) and 186 of the constitution, which address the place of devolved government in the management of the air pollution.

[21]Ibid, at Article 69 (1-f) states, this "The state shall establish systems of environmental impact assessments, environmental audits and monitoring of the environment

[22]Role of national government to "Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development, including, in particular-."

[23]Role of county governments to: "Control of air pollution, noise pollution, other public nuisances and outdoor advertising.

Stakeholder engagement is synonymous with the principles of inclusivity and equity which are directly proffered in the constitution, as principles of environmental governance. This principle manifests through the concept of partnerships and public participation. Article 69 (2), directs cooperation as a duty of both state and citizens to promote effective environmental governance. While there is no direct mention of air, researchers including Sitati Benjamin indicate that the spirt of the constitution in totality speaks to the air within the ambit of environment.[24] This provision calls for deliberate partnership(s) between governments and nongovernmental institutions, amidst civil society to create synergies that advance people's right to a healthy environment including air as envisaged at Article 42.[25]

Government partnering with citizens, civil society and private sector is anchored on Article 10 (2) which speaks of equity and public participation as principles of good governance. Similarly, article 184 sub-article 1 (c) positions local groups into the management of urban areas and cities. This is aimed to reduce social and environmental disparities including the negative environmental effects emerging from development process. Commentators such as Muigua Kariuki, argue that the constitutional provisions are well meaning, but are, to a large extent interpreted in a dangerously anthropocentric manner.[26] This therefore contravenes the duality to recognize people's right to a beautiful environment and ecological capacity to get renewed towards a sustainable environment.[27]

[24]Sitati Benjamin, Management of industrial air pollution in industrial area of the Nairobi County, (Kenyatta University, 2014)
[25]Ibid, n (38)
[26] See http://kenyalaw.org/kl/index.php?id=1906, Muigua Kariuki, Sustainable Development And Equity In The Kenyan Context, accessed on 27/06/2018
[27]Joel Kimutai Bosek,Implementing environmental rights in Kenya's new constitutional order: Prospects and potential challenges, (2014), 14, AHRLJ, 489

Fourth, the constitution gives rise to the concept and right to development and performance.[28] In understanding these concepts, it is important to mention they rest and thrive on defined standards and practices. In accordance with the constitution that right to dignity, which is a standard of life is given to a person at Article 28. Dignity in the context of this research paper, may among other standards mean, as article 42 provides, residing in places of clean and healthy environments, which therefore do not compromise the realization of right to life as espoused in Article 26.

Development and performance require that there should exist: a) responsive institutions that accommodate and employ stakeholder views: b) instruments of environmental appraisal such as Integrated Environmental Impact Assessments (IEIAs) and audits: and c) due process or procedural integrity in the management of the environment. This is contemplated in the constitution. Article 10 (2) refers to sustainable development as a principle of governance. As for environmental instruments, Article (1-f) envisages set mechanisms to facilitate environmental impact assessment, audits and continuous or structured scrutiny being carried out.

The right holder and duty bearer concept manifests as the fifth aspect of environmental management in the constitution. Article 1 of the Constitution affirms that sovereign powers belong to Kenyans and cautions that such powers are executed in the set guidelines of the constitution. The constitution has given people rights to a healthy and secure environment for which air is a major component. In Article 42 and 69 the provisions are clear. Likewise, the constitution has created a duty-bound relationship, making national and county governments

[28]Maurice Odhiambo Oloo, The role of courts in environmental management: The case of Kenya, (University of Nairobi, 2003), A master's thesis

accountable to the people. This partially prescribed in the fourth schedule as well as in Article 10 about transparency[29] and accountability in governance.

While the constitution obligates both duty bearers and right holders to protect the environment, it does emphasize the right for right holders to access relevant and timely information on a particular matter held by any person including the state that can have an effect on their life as provided for in Article 35. As mentioned earlier, assertions by Angote Oscar in his study on the place of ELC in handling environmental disputes point to either absence of information on air pollution or deliberate withhold by state organs of the same from the public.[30]However, in Article 70, both the state and public are bound to play their roles without fail. Further, where the law does not provide direction, Article 186 (4), allows parliament to legislate for the country on any matter,[31] and legislation on air merits this where there is none.

The researcher acknowledges the broadness of the constitution in protecting air from pollution. It offers people two distinct rights: right to development through Article 2 (6),[32] which brings on board the Declaration on the right to development under Article 1 (1)[33] and contextualized at Article 10 (2-d) on sustainable development: and right to clean and healthy environment affirmed by Article 42. While this seeks to achieve optimal integrity of development and

[29] See UNEP Report, Introduction to Environmental governance, p. 8 "Transparency: Transparency means that the decision-making processes, as well as the enforcement of decisions, follow rules and regulations. In addition, information needs to be freely available and directly accessible to those who will be affected by such decisions and their enforcement. Information needs to be provided in an easily understandable form and through appropriate media that reaches the people concerned"

[30]Ibid 58

[31]Supra at 78

[32]Supra note 78, Article 2 (6) states thus; Any treaty or convention ratified by Kenya shall form part of the law in Kenya under this constitution".

[33]United Nations, Declaration on the right to development, (United Nations, 1986) at article 1 (1) states thus: "The right to development is an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized." Found on https://www.ohchr.org/EN/ProfessionalInterest/Pages/RightToDevelopment.aspx, accessed on 06/07/2019

environment, interest to have clean air is partly defeated by absence of information in public domain on air pollutants, levels of pollution and possible mitigation, if at all. Therefore, for an effective realization of clean air, right to information at Article 35 must be applied unfailingly to entrench a vigorous duty bearer and rights' holder relationship.

Further, absence of information does hamper the meaningful involvement of stakeholders, especially local communities to participate in Environmental Impact Assessments, with regard to air pollution. For instance, Egondi et al, proffers that likely affected communities in the slums become alive to unhealthy air conditions upon using their sense of smell to detect repugnant air and other odours, but are unable to corroborate what that means to their wellbeing due to dearth of information regarding the impact of air pollution.[34]

Did the Constitution anticipate consultative approach to deal with the management of clean air? Yes. Under article 186 the functions of national and county governments are provided, and itemized in schedule IV. Paragraph 22 of the schedule speaks to air pollution as a devolved function. Whether, the counties have capacities to undertake such a sophisticated function is in doubt.[35]

Considering that air pollution is of transboundary nature a fundamental question remains unanswered as to whether neighboring counties have mechanisms to deal with air pollution cutting across the different jurisdictions. In this context, would the role of national government, through NEMA come into play. These scenarios have been alluded to by the Permanent

[34]Egondi T, Muindi K, Gatari M, Kyobutungi C, Ng N, Rocklov J., Measuring exposure levels of inhalable airborne particles (PM2.5) in two socially deprived areas of Nairobi, Kenya. (2016), Environ Res, 148:500-506.

[35]Phyllis Wakiaga, How Counties can benefit from environmental governance, found on http://kam.co.ke/counties-can-benefit-environmental-governance/, accessed on 06/07/2019

Secretary in the Ministry of Environment Mr. Sunkuli who, during the annual conference on Air Quality control at ICRAF headquarters in Gigiri (Nairobi) called for inter government collaboration to enforce the regulatory framework to improve air quality in the country though a devolved function as at Schedule IV.[36] In the absence of clear referral and collaborative framework, that directs inter-county relationships on air pollution, there is likeliness of inconsistent and uncoordinated approaches at the detriment of people.

On the overall, without being generous to the inconsistencies cited, the constitution has addressed issues regarding people, planet and prosperity. It has given window to formulate and implement responsive laws and policies regarding the environment. The dilemma that this research seems to grapple with is why air pollution seems to escalate yet there are laws, policies and regulations, as well as responsive institutions such NEMA, County governments and others including ministry of environment

2.3 National Laws on Air Pollution Control

2.3.1 Environmental Management and Coordination Act

Though enacted in 1999, Environmental Management and Coordination Act was reviewed in 2015[37] to be in harmony with the Constitution 2010. Section 7 establishes the National Environment and Management Authority (NEMA) to majorly protect and conserve the environment in Kenya. The role of NEMA are substantiated at section 9 but for air pollution control provided at section 78 where threshold for clean air is given.

[36]Ministry of environment and forestry, "Kenyans unaware of that air pollution is a serious problem, Quote from PS Sunkuli during the Kenya Annual Air Quality Conference at ICRAF, dated 4th of July 2019, found on http://www.environment.go.ke/?p=3085, accessed on 06/07/2019

[37] EMCA, (1999)

EMCA creates the sustained link between the Ministry that manages environment and natural resources and NEMA, making the Cabinet Secretary (CS) chief decision maker and director on all matter's environment. The CS is expected to facilitate good governance in conserving and protecting natural resources and environment, besides, as placed at section 5 of the EMCA, offer institutional leadership, in particular sustainable development demanded at Article 10 of the Constitution. Further, the CS must push for inter-agency coordination and organize inclusivity on air pollution control in the largesse of managing the environment.

The role of the CS with regard to air pollution control are housed at section 78 of the Act and are executed upon advice from NEMA. The duties include the following (a) setting standards and processes to measure quality of air including those that define ambient qualities. The CS's position further calls for him or her to establish measurements for occupational air besides emissions from various sources. Moreover, EMCA directs the CS to schedule and implement guidelines to regulate air pollution from mobile and stationery sources. The section is elaborate on the duties of the CS. At subsection 78 (c) it is expected of the CS to order redesign or modification of plants and installation of appropriate technologies to reduce and guard against real and potential air pollution, and also guard against potential.

Minimization of greenhouse gas emissions is also a responsibility of the CS. It is expected that he or she offers guidelines as captured at 78 (d). The CS is required to take necessary steps to reduce air pollution, including mainstreaming monitoring and evaluation measures to ascertain the cleanliness of the air at any given time in the country.[38]

[38] Ibid

Other functions of the CS are articulated at section 9 (p)[39] which is to receive reports on the state of environment, which includes matters of air pollution every two years, for which he/she shall present before the National assembly and based on the recommendations direct certain actions to be taken that are either curative or preventive in nature. To demonstrate this role, the Cabinet Secretary Honourable Keriako Tobiko has previously ordered investigations to concerns raised by residents of South C estate in Nairobi, indicating that since 5th day of March 2019, there had been a strange pungent smell in surrounding air.[40]

EMCA is broad and addresses all environmental matters affecting and likely to affect the country. However, on air pollution and by powers under section 147, the Cabinet Secretary (CS) has been able to formulate two important regulations.[41] First, there is the Environment management and coordination (Fossil Fuels Emissions Control) regulations of 2006.[42]Second, there are the Environment Management and Coordination (Air Quality Control) Regulations of 2014.[43]

Environmental planning has been identified as a management aspect to reduce air pollution. Section 37 (1) of EMCA provides for National Environmental Action plan (NEAP) every six years[44] and a review within three years of implementation.[45] This provision is important as it gives room for proper planning, inclusion and budgeting of necessary mitigations for purpose of forestalling growth of air pollution, based on evidence of industrial development and trends that inform rural and urban lifestyle as well as settlement patterns. In a conference to address

[39]Ibid, at section 9 (p)
[40] Josephat Thion'go, CS Tobiko takes over probe on toxic gas emissions in Nairobi South, (9th- April 2019, The Standard) found on https://www.standardmedia.co.ke/business/article/2001320222/cs-tobiko-orders-probe-into-toxic-nairobi-gas, accessed on 09/07/2019
[41]Ibid, (n 38) section 47
[42]Legal notice No. 131 of 2006
[43]Legal notice No. 34 of 2014
[44]Ibid (n 41) Section 37 (1) and (2)
[45] Ibid, at section 37 (5)

air pollution experts such as Michael Gitari implored African governments including Kenya to generate homemade policies based on environmental plans to ensure that air pollution is addressed fully. This, they said would help in planning hence point towards development of relevant preventive and curative infrastructure.[46]

EMCA underscores public participation pursuant to Articles 10, 69 (1-d) and 174 (c), of the constitution, subsequently stressing people's centrality in decision making. This aspect interfaces well with the reviews of NEAP among other planning interventions within the Act. This approach was mentioned as best practice in the conference, where Dr. Nicholas Ozor of the African Technology Policy Studies (ATPS) beseeched African governments to intensify public awareness and education on the need to improve air quality, besides putting in place a responsive infrastructure, especially to curb air pollution in the ever-expanding cities.[47]

Ozone layer which may impact the quality of air is protected at Section 50 of the EMCA.[48] This speaks to the need to protect the air from pollutants likely to interfere with atmospheric composition to make negative claim at the ozone. In this regard, and according to the National Ozone Office in the Ministry of Environment, Kenya remains committed to phase out production and use of chemicals that harm the Ozone layer. Similarly, under the Climate Change Act (CCA), acquired mitigations that progressively remove ozone depleting substances, including reduction in such importations of hydrofluorocarbons (HFCs), halon, Methyl bromide and black carbon, even if this injures the economy in the short term.[49]

[46]Duncan Mboyah, Polices to curb air pollution needed, (April, 2018), found on https://scienceafrica.co.ke/policies-to-curb-air-pollution-needed/, accessed on 06/07/2019
[47]Ibid
[48]Ibid, (n 41) Section 50
[49]Standard Digital, Kenya renews pledge to phase out ozone depleting substances, (2017), found on https://www.standardmedia.co.ke/business/article/2000207705/undefined, downloaded on 06/07/2019

Reduction of opportunistic air pollution is anticipated under the regime of Environmental Impact Assessment and Strategic Environmental Impact Assessment (SIEA). Section 57 (A-2 is specific that all implementable programs, including policies and plans have to be subjected to SIEA, considered to be a prior condition before a project can be executed deemed by NEMA as to have significant effect on the environment.[50] SIEA is a methodology that employs analytical tools and invites participation of stakeholders in setting or integrating environmental protective pillars into development and its policies, plans and programs, likewise appraise the relationship such projects have with the economy and social structures.[51]

A case to demonstrate the import of EIA in guarding against air pollution is found in Hosea *Kiplagat& 6 others v National Environment Management Authority (NEMA) & 2 others*[52] in which the plaintiffs, alleged that among other detrimental environmental factors, the respondents had colluded to ignore likely abuse of air through pollution, therefore disputing the construction of a health and medical facility that would be open to public and in a highly populated residential area. While the honorable court sitting in Eldoret dismissed the matter, the orbiter dicta within it demonstrated the significance of EIAs, with special emphasis for schemes that are purposeful to synergize environment and community concerns into project designs. Nonetheless such plans must be systematized, organized to include multi stakeholders' interests and open enough to indicate transparency and openness. This is because the function to control air pollution is collective.[53] Similar thoughts have been shared in a policy brief done by Strathmore University in which the import of EIAs is canvassed as central to management of clean air in Kenya.[54]

[50]Ibid, (n 39), Section 57 (A-2 b)
[51]NEMA, National guidelines for strategic environmental assessment in Kenya, (Revised, 2011)
[52]Hosea Kiplagat & 6 others v National Environment Management Authority (NEMA) & 2 others [2018] eKLR
[53]Ibid, on the summary responses by Honourable Justice Ombwayo Anthony in contextualizing his holding.
[54]Strathmore University, Briefing: Integrated Environmental Impact Assessment (IEIA), policy brief, (Extractive Industry Centre, 2015)

EIAs are preemptive in design. To prevent air from unnecessary and possibly foreseen pollution as is given by Phillip Sands. There is also an impression to entrench internal project or development controls to ensure that air pollution does not result from processes of production. This is corroborated by the process of carrying out EIAs, as when feedback is received license seekers must respond appropriately.[55] The disconnect, as hinted by Benjamin Barczewski is the arrangement where investors lead the process, including recruitment and remuneration of the assessor.[56] Whether, this promotes integrity of the EIAs is an issue under contestation, especially doubts about the reliability of data and information collected and shared with NEMA, as terms of reference for such assignment[57] are purely generated by the investor.[58]

The other aspect, though important on how EIAs can be used to protect air from pollution is public participation. In the annual conference of April 2019, it was revealed that public awareness on air pollution is quite low and most people do not understand the magnitude of the impact.[59]

Apart from EIAs, EMCA provides for other standards such as allowable emission standards. In particular the CS at section 78 (d-e) is mandated to use recommendations from NEMA to regulations regarding emissions of greenhouse gases to the minimum, separate from sanctioning technologies to scale down air pollution. The law is generous to the CS as it gives him or her the latitude to carry out any other action as strategic to monitor and demean air

[55]Philippe Sands, "Principles of International Environmental Law,"2nd edn, (Cambridge University Press,2003), 799
[56]Ibid, 22
[57]Section 11 (1) of Part III
[58]Sam Amimo, Which way environmental impact assessments in Kenya? Available at https://meshakenya.wordpress.com/2011/08/10/which-way-environmental-impact-assessment-in-kenya/, accessed on 27/07/2018
[59]Ibid, (n, 36)

pollution.[60] Further at section 80 (1), the EMCA obligates a business or a person to seek an emission license, if at all their business, operation, trade, and industry emits substance likely to cause pollution.[61]

However, there is indication that NEMA must first establish the possible impact that such emission(s) can have on the cleanliness of air. Second, review requirements and effects the emission could have on residents, human settlement and other industrial, besides commercial activities. Third, NEMA is expected by EMCA at 81 (d) to solicit the comments of relevant Local Authorities and concerned organizations.[62]As to how this arrangement is likely to turn out, looking at the rights of the environment, business and people can be inferred at section 81 (f), which dictates the need for an EIA in the event that prevailing conditions so require. The disconnect, which then is the presupposition of operational omission for the emission licenses lies in the fact that the license seeker must be the one to carry out the EIA, whenever the doubts prevail.[63]

Doubts about effectiveness of the EIA has been emphasized Michael Gitari among other environmental governance experts who has indicated why laws alone are not enough, because of other operational and attendant factors which contributes to effective compliance.[64] On operational issues, particularly the subject of EIAs, which substantively have been indicted for not capturing air pollution possibilities, the aspect of project proponents drafting the terms of reference, recruiting and remunerating environmental assessors provided for at section…. does not certify process threshold and likely subjugates integrity on policy, planning and

[60]Section 78 of the EMCA
[61]Section 80 of the EMCA
[62]Section 81 (a-d) of the EMCA
[63]Section 81 (f)
[64]Ibid, (n, 36)

development of air pollution remedial schemes. In fact, most authors on this subject have called this a retrogressive employer-employee relationship which may not disregard likely prejudice on environmental impact assessment reports.[65] This has previously been alluded to by authors as Benjamin Barczewski[66] and Duncan Mboyah.[67]

Part II of the EMCA provides for the general principles in environmental management. Specifically, a person proceeding to court over a matter of threatened or injured environment at section 4 can position the polluter pay principle that allows the court to obligate the abuser to undertake actions that revert the polluted environment back to its near original state including paying for any damages caused to human, animal and plant life.[68] This also includes shouldering the full cost of rehabilitative clean up to reinstate the standards of the environment as per NEMA regulations.[69]

EMCA anticipated disputes due to competing interests, environment being a shared resource. Section 125 establishes National Environmental Tribunal whose primary role is to hear and determine matters that originate from environmental concerns over live or anticipated projects. In doing its work, the NET has been given prerogative to wave off application of rules set out in Evidence Act (Cap 80) at section 126 of EMCA. To underscore the importance of NET in air pollution matters, this study refers to the holding in *Mbole Nzomo Anthony & 3 others versus Shreejii Enterprises Ltd & 4 others*, in which the High Court sitting in Mombasa, while dismissing the prayers raised by the plaintiff on allegations of respondent establishing

[65] John Kakonge, Environmental Impact Assessments: Why it fails in Kenya, found on https://www.pambazuka.org/land-environment/environmental-impact-assessment-why-it-fails-kenya, accessed on 09/07/2019
[66]Ibid, 22
[67]Ibid, 128
[68]Part II, General Principles (EMCA, 2015)
[69]Ibid, at 142 (2) and (3)

production plant that would pollute the air from processing of sodium silicate, denoted that NET would have been the first station of redress whose outcome would then be contested before it as an appeal. Justice Ojwan'g rightly stated theirs was a second and higher level adjudication as an appellate body.[70]

In ring fencing dispute resolution mechanism of environmental nature for which air pollution is, EMCA at section 20 created the National Environment Complaints Committee (NECC) replacing the now defunct Public Complains Committee (PCC).[71] The functions of this committee include investigate allegations or complains related to the environment. Besides prepare annual reports on the state of the environment and carry out public interest litigation raising citizens' concerns with regard to abuse of environment. The bigger picture for the committee's mandate is to enhance and expand environmental justice which incorporates greening of energy and this is in resonance with air pollution concerns.

Since its formation NECC has handled cases for different environmental disputes of the listed magnitude: 30% on waste management: 9% of water pollution: environmental impact assessment- in the following degrees-12% on deforestations, 9% on land related matters especially dealing encroachment to riparian land, 12% on air pollution and 19% noise pollution, while the remainder of 13% comprises of cases originating from quarrying, poor physical planning and zoning practices.[72]

2.3.2 National Transport and Safety Authority (NTSA) Act

The NTSA Act created The National Transport and Safety Authority (NTSA) since 26th October 2012. NTSA is fashioned to coordinate departments with powers to manage road

[70]Ibid, 78
[71]Ibid, at 20 of the Amended EMCA
[72]National environment complaints committee consultative meeting on public interests litigation on education, found on, https://kepsa.or.ke/national-environmental-complaints-committee-consultative-meeting-on-public-interest-litigation-on-education/, accessed on 10/07/2019

transport in the country and any other sub-sector, which contributes to the reduction of accidents, hence lives and cost of treatment. Section 4 (1) is specific to the mandate of NTSA. First, NTSA has an advisory role directed at the CS, Ministry of Transport on road transport and safety. Secondly, NTSA is an implementer. The quasi-government body executes policies made for road transport and safety, which is a partial function of managing, organizing and regulating the road transport system to exude safety and reliability. At its broadest, NTSA is bestowed with the responsibility to implement any Act of Parliament as directed in the First Schedule of the NTSA Act.[73]

On air pollution control the NTSA Act at section 4 (2) NTSA while performing its functions under section 4 (1) creates an inventory of licensed motor vehicles, similarly conduct inspection and certification of.[74] Furthering this function in the counties, NTSA will establish county transport and safety committees to oversee administration and functionality of transport system and prepare audit reports explaining the veracity of an effective road transport system. In addition, the committee would commit to advise NTSA on matters affecting road transport which in this case can include state of emissions from motor vehicles.[75]

NTSA Act at section 42[76]gives NTSA powers to discourage use of motor vehicles that seem to be in contradiction with the regulation of the Act particularly checking out of excessive emissions credited with about 58.7% of health complications in urban centres. The

[73]Section 4 (1) of the National Transport and Safety Authority Act, Number 33 of 2012, (2012)
[74]Ibid, section 4 (2-b)
[75]Ibid, section 22
[76]Ibid, at 42, which states thus, "A police officer in uniform may stop and inspect any vehicle with a view to ascertaining whether or not the provisions of this Act or of any regulations made thereunder have been complied with, and may demand for inspection the production of any licence, certificate, document or record of any description whatsoever which may, under the provisions of this Act or of any regulations made thereunder be required to be carried on such vehicle and may require the driver or any other person travelling on such vehicle to give such information as such police officer may reasonably request in order to ascertain whether or not the provisions of this Act on regulations are being complied with."

discouragement by NTSA includes ascertainment of whether such vehicles are in good conditions, provided for under section 30.[77]Other safeguards are provided in the NTSA Regulations of 2017 which mandates NTSA to carry out ad hoc inspections, besides the annually slotted ones for all commercial vehicles. This action is guided by regulation 14 shall undertake safety audits but based on vehicle maintenance records.[78]

2.3.3 Traffic Act and National Police Service (NPS)

The NPS plays an important role to ensure that motor vehicle emissions do not supersede the recommended levels. At section 10 (a) of the Traffic Act, the NPS can recommend non-registration of motor vehicle that has failed to satisfy the threshold of importation set out by the Act and policies in Kenya.[79] This may include provisions such as restrictions on the age of cars, for which in Kenya 8 is the minimum with proposals to increase the threshold to five. The purpose of this restrictions, is partly informed by the need to reduce pungent emissions from motor vehicles accused of polluting 75% of the cities in Kenya.

On the capacity to control air pollution the NPS is directed by section 51 (1) of the Traffic Act, banning use of non-gazetted fuel by any motor vehicle or a compression ignition engine on Kenyan roads, save for guide from the CS if any.[80] According to a report carried out by Energy

[77] Ibid, at section 30, which states "30. Conditions for the issuance of a license (1) It shall be a condition of every license issued under this Act that— (a) the motor vehicle in respect of which the license is issued is maintained in a fit and serviceable condition:"

[78]See Regulation 14 of the National Transport and Safety Authority Regulations (2017)

[79] Traffic Act, Section 10 (1), Cap 403, (Reviewed, 2018), found on file:///Users/pm/Downloads/TrafficAct39of1953.pdf, accessed on 10/07/2019

[80]Traffic Act, Cap 403, (2018), section 51 (1).

Regulatory Commission in 2014 does indicate cars especially diesel run engines with adulterated fuels tend to spew more carbon dioxide emissions which worsen the quality of air.[81]

Powers of the NPS is enhanced by section 55 &1) of the Traffic Act, that underlines the removal of vehicles off the Kenyan roads with parts and equipment of poor quality. Similarly, parts and equipment of such vehicles will have to be maintained in conditions that driving the same does not threaten, jeopardize wellbeing of counterparts on the roads and persons travelling in it.[82]

NPS's authority extends to the obligation stated at section 105 that points to their prerogative to stop and inspect any motor vehicle suspected to flout any section of the traffic Act. The NPS are therefore a key plank in the administration and management of actions which purpose to reduce, prevent or abate air pollution.[83] Moreover, the Penal Code at section 192, NPS can frame for a suspect fouling the air. The section prohibits any person from deliberately abusing the air making it less palatable to human health. NPS is allowed to charge one for a misdemeanor should the offense be committed.[84]

Nonetheless there is no section in the Act specific to air pollution from vehicles. This scenario is disturbing because motor vehicles in Kenya are some of the highest polluters. Records indicate that most cars do not have catalytic converters. Catalytic converters lower the degree of hazardous nitrogen and oxygen particles in car emissions that become part of the breathable

[81] Energy Regulatory Commission, A report on Global Fuel economy initiative study in Kenya, (July, 2014) found on, https://www.globalfueleconomy.org/media/461029/africa_erc-gfei-kenya-final-narative-report-23-07-2014-_2_.pdf, accessed on 11/07/2019

[82]Ibid, 197, section 55 (1)

[83] Ibid, 105 (1), which states, "……for the purpose of carrying out any examination and test of the vehicle with a view to ascertaining whether the provisions of this Act are being complied with or with a view to ascertaining whether the vehicle is being used in contravention of this Act."

[84]See section 192 of the Penal Code

air.[85] While there are traffic rules upon which traffic police officers charge motorists, experts decry that such actions are short in application because of corruption and unproportionate number of officers serving many Kenyan roads.[86]

Furthermore, there are reports as given by Keya Opondo pointing to the under reporting of air pollution caused by cars. What is even more disturbing is the lucrative trade from the metal converter parts, due to its composition.[87] The converters are made out of platinum, palladium and rhodium, which fetch so much ready cash in the black market. This is besides the less punitive standards set by the Kenya Bureau of Standards at the inspection as vehicles cross the port of Mombasa in to Kenya.

In an apparent admission of the inadequacy of existing policies and laws targeting smoking vehicles by the Cabinet Secretary of transport Mr. James Macharia stated thus; "We have never had serious policies on emissions. By the end of the year, we will kick off inspection of all vehicles including private vehicles and we urge all citizens to comply with the exercise." This he spoke at conference entitled "promoting soot-free and sustainable public transport in Africa held in Nairobi. The only threat he gave in this forum, was the revocation of licenses (for public service vehicles), removal and banning of such unroadworthy vehicles from the roads.[88]

[85]Jane Luesby, Why Nairobi's air pollution is deadly, found on https://www.businessdailyafrica.com/analysis/columnists/Why-Nairobi-s-air-pollution-is-deadly/4259356-4206518-o2mmvi/index.html, accessed on 06/07/2019

[86]Isaac Kalua, Dangerous car emissions are degrading the environment, (The Standard Digital, 2017), 23rd April, found on https://www.standardmedia.co.ke/article/2001237309/dangerous-car-emissions-are-degrading-the-environment, accessed on the 09/02/2019

[87]Keya Opondo, Analysis of the governance framework for vehicular air pollution abatement in Kenya: A case of Nairobi (2017, University of Nairobi, Institute for peace and environmental studies)

[88]Josephat Thion'go, Kenya plans to drive smoking vehicles of the roads, (The Standard Media, 2016), 31st May, found https://www.standardmedia.co.ke/article/2000203557/kenya-plans-to-drive-smoking-vehicles-out-of-roads, accessed on the 10/02/2019

2.3.4 Climate Change Act of 2016

Climate change is defined by the Climate Change Act (CCA), as modification of the climate system caused by consistent and high degree in the content of greenhouse gases owing to activities carried out by man, besides natural climate change that has been observed during a considerable period.[89] To enable the country exploit both opportunities and challenges which originate from climate change issues, the CCA has empowered the CS, Governors and created National Climate Change Council (NCCC) at section 4 (2).

Further, the CCA by section 4 of the Act gets life from the constitution as enumerated. In discharging their functions all officers of the state and both governments including those of statutory bodies will observe Article 10 of the Constitution and the values and principles of public service in Article 232 of the Constitution. Their role will be bolstered by working to promote Article 42 and 69 of the Constitution, focusing on climate smart mechanisms to arrive at sustainable development.[90]

In part III as from section 13, the Act points out the functions of the National Climate Change Council elucidated in the National Climate Change Action Plan (NCCAP) and specifically the control of greenhouse gas emissions towards reduction of carbon concentrates in the atmosphere, at section 13 (2-m), besides the urgency to arrive at low carbon climate resilient development, a deliberate focus on the role of private sectors in managing greenhouse gas emissions. Equally, it also provides for the scientific knowledge available for informed decisions. The Act also provides for mitigation and adaptation funds.

[89]Climate Change Act, Section 2 Interpretation, (2016)
[90]Ibid

There is a proposed National Automotive Policy of 2018 fronted by the Ministry of Industrialization which directs some of its efforts to the question of emission(s) by motor vehicles. Under the proposed National Automotive Council (NAC) at section 9.1 (1), measures to facilitate investment in innovation and technology through industry relevant research and development, especially suitable to local market will pursued without deviating from globally recognized standards in fuel efficiency and reduced emissions.[91]

2.3.5 Energy Act

The Energy Act of 2019 creates a number of institutions whose functions directly impact on the quality of clean air in Kenya. At part III 10 (q), the Act provides for the Energy and Petroleum Regulatory Authority to work with and alongside other relevant statutory authorities such as NEMA to establish, review and enforce laws, polices as well as regulations for integrity in environment, health and safety for the upstream petroleum sector.[92] Besides at 10 (gg) the Act is expressive to the realization of Article 10 of the Constitution.[93] At 10 (hh) the Act further affirms bestows the Energy and Petroleum Regulatory Authority duty to protect consumers, investors and stakeholders' interest. By inference this includes the state of air in the country.[94]

At section 43, the Energy Act creates the Rural Electrification and Renewable Energy Corporation (REREC). The corporation is charged with rural electrification including management of renewal energy in Kenya. These roles are aimed at ensuring that counties whose sole responsibility in air pollution control cannot be overemphasized are not energy reliant but free from air pollution which emanates from excessive use of biomass. The Act at

[91] Ministry of Industrialization, Draft National Automotive Policy, (January, 2019), found on http://www.industrialization.go.ke/images/downloads/Draft-National-Automotive-Policy-Executive-Jan-2019.pdf, accessed on 14/07/2019
[92] Energy Act, Part III (10-q)
[93] See n (5)
[94] See n (91)

44 provides for the support to establish county energy centres, which then play a role in the operationalization and adoption of efficient on-farm and on station technologies of wood fuel species seedling, production and management.[95]

Section 44 (1-j) is directed to air pollution control, where the REREC is empowered to partner with other agencies to promote use of sustainable energy and know-hows beyond biomass and include proliferation of biodiesel, municipal waste solar, wind and tidal waves exclusive of geothermal. The REREC is mandated to develop a national action plan to coordinate studies in replicative energy, similarly disseminate appropriate technologies for adoption and replication.[96]

At section 44 (1-o) the Act mandates the REREC to develop relevant home-grown competencies to manufacture, install, maintain and operate renewable energy technologies contextualized as bio-digesters, solar systems and turbines. This, as mentioned at 44 (1-q) includes the ring fencing of clean development prospects contextualized in the league of carbon credit trading to proliferate renewable energy sources that are sustainable.[97]

2.4 National Policies on Air Pollution Control

2.4.1 National Environmental Policy

National environmental policy is the road map upon which environmental management is run. Section 6.1 of the NEP provides for quality air in Kenya. At sub-section 6.1.1 the policy considers air pollution a cause of many respiratory illnesses comprising Protracted obstructive

[95] Ibid
[96] Ibid,
[97] See n (95)

pulmonary disease (POPD), lung cancer, pulmonary heart disease and bronchitis. Further, it recognizes the corrosive relationship of outdoor and indoor pollution, making note of how the latter affects both rural and urban populations. This is based on the fact that many Kenyan households use wood fuels for domestic cooking.[98]

The section further provides policy statements with regard to clean air: policy statement one alludes to faithful implementation of Air Quality Regulations: statement number two speaks to promotion of competent non-polluting and human powered transport within an efficient public transport system: and policy statement three addresses promotion of non-polluting modes of transport.[99] This demonstrates broadly where the government focuses in trying to get air governance its space in environmental planning.

Section 5.1.0.2 provides for climate change related air concerns. The section focuses what scientists have cautioned in regard to Greenhouse Gas Emissions (GHS). The section explains how the interphase of air and GHS reduces the quality of air and therefore, threatens livelihoods, health and life of both flora and fauna.[100] National environmental policy points to improved ways of production and consumption in order to reduce air pollution. Emphasis is placed on promoting effective use of various sectors of the economy to avoid challenges that are consequent to wastefulness like modified climate, loss of plants and reduction of forest cover that in turn adversely deteriorate quality of air, as this increases carbon content in the atmosphere.[101]

[98]Section 6.1.1 of the National Environmental Policy
[99]Ibid
[100]Section 5.1.0.2 of the National Environmental policy
[101]Elmard Omollo, Popular version of the National environment policy, 2013, (The International Development Institute, supported by UKAID, Embassy of Sweden and Act-Kenya, 2013).

2.4.2 Environment Management and Coordination (Fossil Fuels Emissions Control) Regulations

The Environment management and coordination (Fossil fuels emissions control) regulations came into effect on 1st February 2007 upon realization that a good number of pollutants occurred and got emitted whenever fossil fuels in the likes of gasoline, diesel and kerosene are burned. Under the regulation(s), NEMA at regulation 2 is empowered to undertake a number of initiatives. First, it is expected that NEMA can liaise with lead agencies in the sectors that deal with internal combustion engines to carry out emission inspections. Second, delegate where necessary and in the spirit of expertise as well as capacity to the agencies to carry out similar functions. These regulations emphasize inspection at 4 (1), where all engines designed to burn fuels of any nature comply with set standards and requirements to control air pollution as cited at the First schedule.

Further at regulation 7 (1) NEMA is authorized to endorse fuel catalysts if there is scientific justification, that upon use the fuel economy shall experience some efficiency manifested as improved combustion, subsequently a reduction in harmful emissions. The finality being humans, animals and plants sharing clean breathable air and residing in less degraded environment.[102] In close support of this provision, it is indicated at regulation 8 (1) that any internal engine shall only use fuel treated by a NEMA-recognized fuel catalyst.[103]

At Regulation 11 (1), NEMA is entitled to enter and create partnerships that can ease inspection of internal combustion engines, improve service for fuel marketers, suppliers or fabricators of plants that treat fuels through supplementation of approved fuel catalyst. Similarly work with

[102]Regulation 7 (1) of the EMCA (Fossil fuels emission control) regulations
[103]Ibid at regulation 8 (1)

institutions and individuals whose innovations and technologies on emission reduction contribute to entrenchment of capacity for real time ambient air quality monitoring and networking.[104] Furthermore, at regulation 11 (2), NEMA has duty to partnerships that suffocate fossil fuel emissions, including arrangements to coach environmental assessors for this purpose, or where such is not feasible license private emissions inspectors, in addition to setting up license emissions inspection workshops for learning.[105]

2.4.3 Air Quality Regulations (AQR) of 2014

In 2014 AQR came into effect. The import of these regulations is the threshold given to put the country in a state that can achieve ambient air. The regulations purpose to have clean air in the country by advancing preventive air pollution control measures. Ambient air, considered to be the ambiance surrounding the earth does not include the atmosphere within any underground space.[106]This section is dedicated to the air regulation standards in the country through the parameter set forth by the Air Quality Regulations of 2014.[107]

The AQR has three types of emissions and which are provided for in its provisions. First, there are emissions that are completely disallowed or banned: second, there are emissions that are allowed but measured against subscribed or controlled standards and concentrations: and third, emissions that are not necessarily dangerous but which in excess can cause discomfort. The standards of allowed emissions are provided for in schedule III of the regulations. The facilities that can be used to cause emissions are identified under schedule XIV.[108]

[104]Ibid at regulation 11 (1)
[105]Ibid at regulation 11 (2)
[106]EMCA, Part I, preliminary paragraph 2
[107]Air Quality Regulations, (2014)
[108] Ibid

At part IV from Section 14, the AQR provides for the specific factors with regard to air pollution. It provides that no person will be allowed to release emissions into the air from sources discussed in schedule II of the regulations. However, such emissions can be allowed based on standards set forth in the third schedule. Under section 14 (2), it is provided that any facility listed under fourteenth schedule must not pollute the air for more than three times in six months, lest the law direct such facility to apply for an emission license for proper regulation.[109]

The AQR has provided the specifics for possible air pollution by stationery sources. Particularly it provides a blanket ban for air pollutants listed in the second schedule.[110] However, it has also given a window or balance of development and environment by stating that even where emissions are permitted, the same must be done within specified and recommended limits as is in the third schedule.[111] The air pollutants herein referred include those listed in part I of the second schedule enumerated as particulate matter (Dust, black smoke, smog, aerosols), sulphur oxides (SOX) and Nitrogen oxides (NOX).

Others are listed in part III and comprise of greenhouse gases including Greenhouse gases (GHG) a) Carbon dioxide (CO2); b) Methane (CH4); c) Nitrous oxides (N2O); d) Hydrofluorocarbons (HCFCs); e) Perfluorocarbons (PFCs); and f) Sulphur hexafluoride (SF6). The provisions in regulation 14 are pursuant to regulation 6 and discourages anyone from causing or allowing emissions prioritized as air pollutants under the second schedule to set off excessive ambient air quality shortfalls described in the First schedule.[112]

[109] Ibid
[110]Regulation 14 (1-a), of the AQR (2014), No person operating a controlled facility specified in the fourteenth schedule shall: cause emission of any pollutant listed under the Second Schedule from any point sources without a valid emission license issued in accordance with the provisions of the Act; or
[111]Ibid, (n, 108)
[112]Ibid, (n, 107) at Regulation 6

Further under regulation 16 (1), it is provided that regulatory structures prescribed at the Seventh Schedule[113] be applicable to persons whose immediacy to cause or likely allow emissions of pollutants in abundance of the confines elucidated at the third schedule. This is a demonstration of permissibility of certain air pollutants. As the allowed levels are given a control mechanism by seeking to ensure that responsive technologies are acquired, and limitations as scheduled under third schedule are observed.

The AQ regulations give the licensee freedom to self-regulation. By regulation 18 there is every indication that an opportunity is provided for the licensee to report to NEMA any excess emissions. This notice, as stated in form II of the ninth schedule requires must be shared in twenty-four-hour period post-event.[114] Besides, it is required of the licensee to deliver a written incident report detailing the context of the emission, likely causes and impact to NEMA before expiry of a fortnight after the emission took place. This report should also include preventive measures to forestall such a scenario going forward.[115]

There are provisions creating transgressions for those who contradict the AQR. Regulation 21 allows for the issuance of a control order to forestall breach of any provision of the AQR if not abuse of terms of a license or in response to such breach. The control order may, in consideration of the specific breach, provide guidelines to ameliorate effects of breach, or provide timeline upon which such breach can be addressed. Besides such orders may also demand that every action leading to the breach be ceased forthwith. The AQ under regulation 21 (3) creates an offence, which states thus; "Any person who fails to comply with the provisions of a control order issued under this regulation commits an offence and shall be liable

[113]Ibid, second schedule
[114]Ibid, (n, 107) at Regulation 18 (a)
[115]Ibid, 18 (b) of the AQR

on conviction to a fine not exceeding one hundred thousand or imprisonment for a term not exceeding three years."[116]

Part VI of the AQR provides for the air management for pollution that possibly emanates from mobile sources. Under regulation 24, it is expected that NEMA will monitor emissions from all internal combustion engines and ensure there is responsiveness as defined under eleventh schedule.[117] Further under regulation 25, no person is allowed to emit or cause to emit visible air pollutants from either stationery or mobile vehicle beyond the stated limits.[118] This concern is well founded in section 82 of the EMCA which speaks to emissions by motor vehicles and other conveyances, that such will not be operated in a manner causing air pollution beyond the established standards. Second, no person is allowed to import machinery, equipment and devices that can introduce emissions into the ambient air.[119]

The provision under 25 (2) demands emission control of priority air pollutants itemized at second schedule by any and every operator or owner of a mobile emission source may it be vessel on the road, rail, air, marine and inland water transport and conveyance equipment. To realize this objective, the regulations at 26 provides for possible process. It states that "the Authority in consultation with the agency responsible for motor vehicle inspection may at any time order the inspection of a vehicle releasing visible exhaust emissions."

[116]Ibid, (n, 107) Regulation 21 (1-3)
[117]Ibid, regulation 25 (6)
[118]Ibid, (n, 107) Regulation 25 (1)
[119]Ibid, (n, 20), section 82

Furthermore, NEMA and the responsible agency shall work together through motor vehicle inspection or accredited vehicle testing centres to ensure that all commercial and public vehicles undergo annual emission tests, similarly undertake to carry out similar assessment once every two years on privately owned cars of age five and above.[120]

2.5 County based laws on Air Pollution

Political and executive power is two-tier constitutionally, of 47 counties and one national government. This devolved governance system provides the counties an opportunity to manage their own affairs including protecting air from pollution under the County Government Act, pursuant to Schedule IV of the Constitution that offers functional separation of the counties and national government.

Article 176 anchors principles of devolved governance on the operations of the counties. In this regard, counties as expressed under Article 183 (1) are expected to establish County Executive Committees (CECs) for purposes of implementing county legislation emanating from either level of government. Further at 183 (1-c), the county executive committees have to care take and coordinate the functions of the county administration and related departments. Moreover, at Article 183 (2), CECs are expected to prepare and propose legislation for the County Assembly (CA) to consider and deliberate upon. Besides, the CECs are charged with regular reporting to the CAs on all matters affecting the county.

[120]Ibid, (n, 107), at Regulation 26 (1-3)

The constitution under Article 185 has given the CAs mandate to formulate and enact laws that address issues at the county.[121] At 185 (3) and (4) the CA has the power to oversight work carried out by the CECs or any other county executive agency. Nonetheless, the constitution bestows the CA to favor strategies and policies touching on the overall management and utilization of county resources as well as schemes that improve infrastructure topography.[122]

Section 147A of EMCA mandates any county to make laws in respect of all matters necessary to deal with impending issues to the extent that constitution allows. The powers of the Governor under section 29 of EMCA include the composition of a county environment committee. The CEC will among other persons as described, include representative of farmers or pastoralists and Public Benefits Organization (PBO) active in the environment management sector.

The function of the CEC as provided in section 30 of EMCA is to take up leadership and management of county environment pursuant to schedule IV paragraph 22 of the Constitution. This leadership comprises development of a five-year County Strategic Environmental Action Plan (CSEAP). The County environment committee as directed at section 41 of EMCA has to ensure that each CSEAP is broad enough to include the issues outlines in section 38 of the Act.

Most county laws on air pollution control are a replica of section 78 of the EMCA, which is an impression of the Air Quality Regulations of 2014. This can be traced to the environment policies and regulations of Nairobi, Turkana, Mombasa and Kisumu amongst others. The county of Turkana through the Turkana County environmental (Regulation and Control) Act

[121]Ibid, (n, 5) Article 185 (2)
[122]Ibid, (n, 5) Article, 185 (3)

of 2018, at section12 (1) provides for quality air.[123] The law in Turkana is specific to the pollution by emissions which originate from the processes of exploration and production of oil and gas. This law has been strengthened by provisions that disallow certain levels of dust particles in the air, besides placing a ban on open burning of waste. [124]

Like many other counties, Turkana has tried to put in place a supporting infrastructure that includes ward committees comprising of county environment officials and community representatives to encourage community engagement in the management of environment, especially identification and mapping of air pollution sources.[125] The county has further designated environmental officers to carry out routine inspections, to either advise, monitor or recommend closure of facilities that seem unlikely to reform or improve technologies or interventions that prioritize air pollution control.

Kisumu County has developed a County Environmental Policy. The policy guides air pollution control through various but interrelated ways such as the hygienic solid waste disposal mechanisms which reduce chances of obnoxious smells into the air. The policy at section 2.8 refers to the fundamentality of pursuing sustainable development, emphasizing economic development and environmental protection.

> "…These interlinked components provide the backdrop against which to view changes in the state of the county's environment. This is because they serve as some of the most forceful drivers of environmental change. The main human activities contributing to

[123]The County Government shall adopt the air quality standards set in Section 78 of the Environmental Management and Coordination Act, CAP 387, of Turkana County environmental (Regulation and Control) Act of 2018, (Turkana County, 2018)
[124]Ibid
[125]County of Government of Turkana, Pollution control, found at https://www.turkana.go.ke/index.php/notices/upcoming-public-meetings/, accessed on the 12/09/2019

environmental degradation in Kisumu include unsustainable land use practices, poor soil and water management practices, deforestation, overgrazing and pollution."[126]

Further at policy 6.1 the policy takes cognizance of the interlinkages between sectors and they in different magnitudes contributes to air pollution. Some of these are identified as unsustainable use of land, poor soil and water management practices, open burning in farm, use of wood fuel as the biggest biomass available, in turn deforestation and car emissions. With this background, the policy provides for observation of standards as prescribed by AQR. To respond to the afore-described scenario, the county government has proposed to pursue an aggressive compliance strategy to air quality standards besides enhancing monitoring to identify enforcement capacity gaps. Going forward dedicate resources to human powered transport that is less polluting but interface these with mass transport system that is efficiently managed.[127]

Urbanized counties with higher populations like Kisumu, Nairobi, Mombasa and Nakuru have formulated many laws and put in place policies as well for various actions to effect air pollution control. With reference to the Nairobi Air Quality Action Plan 2019-2023, many strategies emerge. First, is linking the action plan to the overall objective within the County Integrated Development Plan (CIDP), besides ensure that laws, regulations and policies are evidence driven or backed. Second, engage a public education programme on the health and environmental ramifications with regard to uncontrolled air pollution. Third, is to develop effective approaches for air quality management: and fourth, is to establish an effective implementation and enforcement program for air quality legislation.[128]

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[126]County government of Kisumu, Kisumu County Environmental Policy, (2019), found at https://www.kisumu.go.ke/wp-content/uploads/2019/04/Kisumu-CEM-policy-2019-1.pdf, accessed on 20/07/2019

[127] Ibid

[128] Nairobi County Government, Nairobi Air Quality Action Plan 2019-2023, found at https://www.eci-africa.org/wp-content/uploads/2019/05/Nairobi-Air-Quality-Action-Plan_Final_ECI_31.12.2018.pdf#page=8&zoom=100,0,768, accessed on 12/09/2019

Further, counties have tried to integrate or adopt a non-motorized transport policy framework. This is informed by the growing number of motor vehicles in the country. In Nairobi is estimated that by August 2018, about 940, 672 car units were plying the roads.[129] The need to reduce the amounts of emissions emanating from motor vehicles. In this regard Nairobi has put in place a Non-Motorized Transport framework to aid in developing relevant infrastructure than can aid its implementation. In 2015, the Nairobi County Government commenced Non-Motorized Policy to address interests and rights of about 47% of the many who walk to and from work every morning and evening after receiving support from UNEP. With this policy 20% of the road construction budget was to be dedicated to NMT investments.[130] In executing the NMT policy Nairobi has planned to build cycling pavements, walking pathways that are separate from motor ways, similarly educate and carry awareness on benefits of cycling and carpooling to reduce the number of motor vehicles emissions.[131]

Similar approach has been tried in the County of Mombasa. The partnership between Trade Mark East Africa and County Government of Mombasa since 2015 have engaged in paving 23 kilometers of road for cycling and pedestrians who access the port of Mombasa. This among a clear forestation program to ensure that purification of air happens in the busy port of Mombasa. However, listening to the conversations between Trademark East Africa and The Share the Road Program indicate that the Non-motorized approach was a thought to be integrated when assessments begun revealing the impact of roads on pedestrians.[132]

[129]Ibid
[130] UNEP, Kenya-Nairobi NMT policy enacted by Nairobi City County Government, found on https://www.unenvironment.org/ar/node/565, accessed on 20/07/2019
[131]Ibid
[132]Cherotich Mercy Langat, Segregation of motorized and non-motorized forms of transport along the southern bypass section of kikuyu town, (University of Nairobi, 2015)

Counties especially Nairobi, Mombasa and Turkana have also embarked on capacity building initiatives for their environmental officers to manage better air pollution control initiatives. In their various polices and action plans, environmental officers are being exposed to relevant technologies and equipment to monitor and collect data on ambient air qualities. This is based on the realization that most do not have centralized monitoring system, and rely heavily on information collected from different points spread across the counties for analysis. Therefore, ability to interpret data and relate the same to the likely air pollution sources makes good case to evidence driven air pollution control measures.[133]

Physical planning and development is fast emerging as a strategy towards air pollution control among other important functions it serves. Counties have identified as measure against air pollution. Turkana for instance has mooted plans to relocate the air strip both in Lodwar and Kakuma, if it all the county assembly approves. This is aimed at reducing the amount of dust particles set into the air upon takeoff or landing of the many flights that frequent the region. Another aspect of physical planning can also be found in Isiolo where the county government is paving and carpeting roads in the urban centers to reduce dust particles in air.[134]

Nairobi county in accordance with Nairobi Urban Integrated Plan with emphasizes separation of residential, industrial parks and other social amenities. The plan provides that Runda, Ruaka, Ruiru, Ruai, Karen and Langata be transformed into pure residential zones, while the city's central business district expands eastwards towards the Uthiru and Kabete areas. This will then

[133]The World Bank, Kenya Accountable Devolution Program (KADP), found at https://www.worldbank.org/en/country/kenya/brief/kenyas-devolution, accessed on the 13/09/2019
[134]County Government of Isiolo, County Integrated Development Plan, 2018-2022, found at https://isiolo.go.ke/projects/#.XXtcSlRR2b8, accessed on the 13/09/2019

be supported by making commitment to create an industrial park and commercial sites in Donholm and Northern Airpot road.[135]

In Kisumu as indicated therebefore, focuses on effective land management to offset or downsize likely air pollution sources. Most common is the improved models of land management include zoning of areas to improve the forest cover. In Kisumu, the kajulu hills ecosystem has been enriched through the planting of bamboos and other indigenous trees to protect water towers but also to improve the capacity to capture carbon released into the air around Lake Victoria.[136]This approach has also been adopted by counties in the northern frontier which include West Pokot, Garissa, Wajir, Mandera and Marsabit.[137]

Air pollution control is an issue that cuts across sectors. Some counties have also approached control by putting in place climate smart policies and pursued climate proofing of physical infrastructure to reduce effects of greenhouse gas emissions. Counties such as Makueni, Garissa and Kilifi have enacted regulations to reduce greenhouse gas emissions from their various development initiatives. Makueni has the Makueni County Climate Change Regulations, which is supported by Climate Change Regulation Fund for 2015.[138] Garissa has in place a Climate Change Act enacted in 2018 through the support and partnerships with

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[135]Kenya Television Network (Ktn), Nairobi Is Set For A Major Facelift As County Embarks On An Integrated Urban Development, News Item, (15th May 2016)

[136]The World Bank, Reviving Lake Victoria by Restoring Livelihoods, found at https://www.worldbank.org/en/news/feature/2016/02/29/reviving-lake-victoria-by-restoring-livelihoods, accessed on 13/09/2019

[137]**The Star Newspaper, West Pokot forest gets boost as Ketraco, county staff plant 3,000 trees, 4th July 2019, (The Star, Nairobi), found at** https://www.the-star.co.ke/counties/rift-valley/2019-07-04-west-pokot-forest-gets-boost-as-ketraco-county-staff-plant-3000-trees/**, accessed on 13/09/2019**

[138] Government of Makueni County, Makueni Climate Change Regulations and Climate Change Regulation Fund, found at file:///Users/pm/Downloads/Makueni_County_Climate_Change_Regulations_2015.pdf, accessed on 20/07/2019

Development of aid from United Kingdom (UKAID), the Kenya Meteorological Services (KMS) and International Institute for Environment and Development (IIED). This law among other functions provides for funding to community led initiatives to reduce greenhouse gas emissions and a structured public participation in decisions made to ensure that air maintains good levels of quality and breathability.

Other counties have reviewed their by-laws for most of their urban and peri-urban centers. The by-laws alongside development plans have designated specific areas for markets and important identified dumpsites to manage solid waste. These initiatives are mostly guided by policy and law on solid waste management. A case in point is Nairobi, which has A solid Waste Management Act of 2015. In it there are provisions to decommission or commission some of the dumpsites like the one domiciled in Dandora. In a similar case in Mombasa, the Solid Waste Management law speaks to the management of the Kibarani site. This has had the import to discourage open burning of rotting garbage and plastics for recycling by income seeking scavenging groups.[139]

2.6 Improving functionality of law and Institutions

While there are indications that the institutional, legal and policy frameworks are functional air pollution has remained a challenge. Commentators such as Samson Mukaria have in their studies demonstrated that Institutions face a number of challenges to ensure that air pollution is controlled. First, Samson cites the proportionality between functions and resources and casts doubts on the ability to actualize objectives as set out in law and policy in particular AQR and

[139] International Solid Waste Association, Special report for closed dumpsites: Dandora dumpsite-a health and environmentaln tragedy, (November 17, 2017), found at https://www.iswa.org/home/news/news-detail/article/special-report-for-closedumpsites-kenyas-dandora-dumpsite-a-health-and-environmental-tragedy/109/, access on 20/07/2019

section 78 of the EMCA.[140] Financial muscle to deal with incidents of air pollution is an impeding factor for institutions with either national or county mandates, though NEMA's state funding is provided for at section 11 (b) and (c)[141].

Review of the national budget allocations emphasize the inadequacy of imbalance between policy expectation and effectiveness of institutions to control air pollution. In 2016 the budgetary allocation for environmental protection was Kenya shillings 92.8 billion.[142] In 2017/18 and 2019/2020 the same budget dwindled by almost 11% to Kenya shillings 82,340.[143] This downward trend is not commensurate with the cost of air pollution considered one third of the Gross Domestic Product as average in sub-Saharan states.[144]

Good laws require well-articulated and effective interagency coordination to realize the purpose for which they were enacted. For instance, the need for the county governments to work effectively with the National government agencies in air pollution control because this air management transcend political boundaries. Even as Counties such as Nairobi, Turkana, Mombasa and Kisumu make good laws including climate change regulations that respond to air pollution, a more robust work-together formula must be mooted.[145] It is important therefore, that NEMA, NPS and NTSA work together for comprehensive guard against motor vehicle air

[140] SamsonMukaria, Analysis and Perception of Health Impact of Motor Vehicle Emissions on Traffic Police in Nairobi, Kenya, (2017), Vol. 5, No. 3, 104-110 JEPHH, found on https://profiles.uonbi.ac.ke/tthenya/files/analysis_and_perception_of_health_impact_of_motor_vehicle_emissions_on_traffic_police_in_nairobi_kenya_journal_of, accessed on 12/07/2019

[141]Section 11 (b) & (c) of the EMCA on powers and mandate of NEMA

[142] The National Treasury, Budget highlights, 2016/2017 (National Teasury, Nairobi, 2016), found on file:///Users/pm/Downloads/Highlights%20of%20the%202016-2017%20(1).pdf, accessed on 12/07/2019

[143] Parliamentary Service Commission, Unpacking the estimates of revenue and expenditure for 2019/2020 and the medium term, found on http://www.parliament.go.ke/sites/default/files/2019-05/unpacking%20of%20the%20estimates%20of%20revenue%20and%20expenditure%20%202019-20%20Final%2017.5.2019.pdf, accessed on 13/07/2019

[144]Njenga Hakeenah, Kenya: partnership to reduce air pollution deaths in Kenya kicks of, (January, 2018), found on https://allafrica.com/stories/201901280752.html, accessed on 13/07/2019

[145]Winnie Mitulah and Romanus Opiyo, Mainstreaming non-motorized transport (NMT) in policy and planning in Nairobi: institutional issues and challenges, Institute of Development Studies, University of Nairobi, (2012)

pollution, espoused in EMCA, TA and NTSA Acts. A key missing component to the proposed coordination is affirmed by a study of Benjamin Barczewski who cites interagency inability to share relevant information as was the case of the Nairobi Thika Highways Improvement Project (NTHIP) and the Lamu Port and Southern Ethiopia Transport Corridor (LAPSSET). [146]

Concerns have been raised with regard to the law not growing as fast as the expansion of certain sectors. For example, the public service transport by Motor bikes popularly known as "bodaboda" is largely unregulated. There is a weak link if any between inspection of public service vehicles and motor bikes plying the same business.[147] With consideration that Kenya has a fleet increase of 26% annually, the need to constantly review and re-align law to rapid changes is necessary.[148]

Researchers such as Sophie Mbugua[149] and Njenga Hekenaah,[150] observe that good laws, policies and institutions are derailed off their work due to allegations and incidents of corruption, interference with technology especially the removal of Catalytic converters from cars by mechanics seeking to sell the rhodium and platinum within them and manipulation of inspection reports, even the processes. These ugly realities defeat the intended purpose in and of law notwithstanding the expertise, capacity or financial powers within relevant institutions. Some of these concerns were canvassed in *Republic v Faith Naome Kabeso*, in which the

[146]Inventory of Regulatory Requirements to Start and Operate a Renewable Energy Project in Kenya,(2011), found in Benjamin Barczewski at Ibid, 22
[147]Barnes, J.L., and Boyle, J. (2015): "The weak link in EIA effectiveness: challenges in process administration", Proceedings of the 15th IAIA Conference, (20–23 April 2015, Florence, Italy).
[148]Magda Lovei, Phasing out lead from gasoline: Worldwide experience and policy implications, World Bank technical paper 397, Pollution management series, found on http://siteresources.worldbank.org/INTURBANTRANSPORT/Resources/b09phasing.pdf, accessed on 12/07/2019
[149]Sophie Mbugua, Kenya's battle to cut air pollution, International report, 11th March 2019, (RFI, 2019) found on http://en.rfi.fr/africa/20190312-kenyas-battle-reduce-air-pollution, accessed on 12/07/2019
[149]Ibid
[150]Njenga Hakeenah, Kenya: partnership to reduce air pollution deaths in Kenya kicks of, (January, 2018), found on https://allafrica.com/stories/201901280752.html, accessed on 13/07/2019

accused, an employee of NTSA was charged with seeking financial advantage of Kenya shillings five thousand (5,000) in order to release Mr. Boru Galgalo's car which she had confiscated for road unworthiness. The accused person was found guilty on all the charges and fined Kenya shillings 300,000 or a jail terms of two years for each count.[151]

Article 10 of the Constitution is emphatic that sustainable development is a principle of good governance, similar to public participation and inclusivity. However, competing interests between development and environmental sanity alongside political objectives of employment creation tend to disregard the desire to faithfully implement laws that control air pollution.[152] Such opinion has been expressed by Benjamin Sitati,[153] Eunice Omanga in her study on indoor air pollution and Opondoh Keya,[154] who agree that interests of economic development must not defeat the fight against air pollution if the country chooses to observe polluter-pays, preventive and precaution principles of environmental management.

[151]Republic v Faith Naome Kabeso [2019] eKLR
[152]United Nations Environment Program, Connecting Kenya county first ladies to beat pollution and pave way towards a pollution free planet (30th October, 2017, at the UN) https://www.unenvironment.org/news-and-stories/story/connecting-kenya-county-first-ladies-beat-pollution-and-pave-way-towards
[153]Sitati Benjamin, Management of industrial air pollution in industrial area of the Nairobi county, (Kenyatta University, 2014)
[154]OpondoKeyah, Analysis of the governance framework for vehicular air pollution abatement in Kenya: A case study of Nairobi city, (University of Nairobi, 2017)

Chapter Three: Critical Evaluation of Current Approaches to Controlling Air Pollution in Kenya

The purpose of having laws and related institutions of governance is to arrive at compliance towards clean and healthy air. In turn the purpose of compliance is to ensure that laws facilitate an environment in which every individual and present feature enjoy some good level of protection as regards air pollution. This chapter focuses on the different county and national government approaches to address air pollution. Discussions herein are guided by the following question; How responsive are the existing preventive and curative measures directed at achieving quality breathable air. Most of the interventions discussed are anchored on the regulations, policy and legal provisions captured under chapter two and driven by institutions reviewed at chapter 3. However, there are those that do not have policy foundations, though are being practiced and some attention has been directed. The researcher, looks at three approaches employed by the government. This includes: interventions to reduce pollution at source. This particularly addresses systems of production, processing and consumption. Second, the researcher reviews the preventive/precautionary mechanisms currently employed to control air pollution in the country: and third, canvasses on the measures taken whenever clean air laws and regulations are flouted.

3.1 Tried interventions to address indoor and outdoor air pollution

Air pollution persists, though, approaches previous and currently in use have emphasized many other concerns including poor energy sources, deforestation, ill health and over reliance on nonrenewable natural resources. While the state has had many initiatives, several nongovernmental organizations have had their fair share of contributions made nationally and at grassroots. Some key initiatives have comprised of clean energy projects, education

programmes, fiscal policy decisions and importation of technology as well as equipment to monitor quality of presence and essence of clean air. Further, enforcement through the courts of law has also been tried and is ongoing, where constitutional and statutory obligations have been violated. In this regard litigation has grown to be a popular and effective means to arrive at major policy and practice changes on matters of air pollution.

3.2 Interventions to reduce pollution at source(s)

This part of the research discusses the actions, programs and initiatives that have purposed to reduce air pollution at the source. This largely addresses systems and processes of production and touches on consumption measures as well.

3.2.1 Clean fuels and equipment initiatives

3.2.1.1 Clean cookstoves and fuels

Records suggest that 16600 deaths occur in Kenya due to smoke from polluting, open fires and inefficient fuels as 80% of the population rely on solid fuels.[1] In order to reduce such occasions as well as lessen related incidents of ill health, Kenya has tried and encouraged the adoption of efficient cook stoves that largely increase the resilience of women and children (who often are exposed) to cooking and heating, even if men are affected from falling victims of 4,900 who die from cardiovascular diseases and emphysema, besides lung cancer and lower respiratory infections. Proliferation of cleaner and modern cookstoves and fuels has reduced exposure to harmful cookstove smoke. By the records of Clean Cookstoves Association of Kenya the government has been implored to reduce or remove taxes and tariffs that encumber the growth of clean cooking sector in the country.[2]

[1] SNV, Improved cookstoves in Kenya, found on http://www.snv.org/project/improved-cookstoves-ics-kenya, accessed on 13/07/2019

[2]Clean cooking alliance, Clean cooking can help, found on https://www.cleancookingalliance.org/country-profiles/focus-countries/4-kenya.html, accessed on 13/07/2019

To motivate biomass consumers to use alternative sources of fuel and likely cleaner cookstoves such as gas cookers, the government has employed tax incentives in some cases. For instance, in the budget of 2016/2017 the government removed the 16% Value Added Tax (VAT) on Liquified Petroleum Gas (LPG), besides reducing cost of owning efficient cookstoves by taking off 15% of the import duty to 10%, while zero-rated VAT on clean cookstoves, raw material and their accessories as a mechanism to make the cooking technologies more affordable, hence improved availability and access.[3]In an attempt to popularize the use of LPG among the poor, the government through National Oil Corporation introduced the Gas Yetu- Mwananchi project, which purposed to distribute a 6kg (six-kilogram) gas cylinder together with a burner at Kenya shillings two thousand (2,000.00). The goal of this project was to improve quality of life of the many poor Kenyans, besides expanding LPG penetration from 10% to a projected 70% in three years, and of importance bereave the country of lung diseases and significant drop in death rates caused by ungoverned household air pollution.[4]

Further under the National Determined Contributions (NDCs) aimed at fulfilling commitments made under the Paris Agreement the government continues to approve and facilitate the use of efficient cookstoves to reduce emissions of carbon dioxide, Methane and aerosols under the climate change remedial regime.[5]

3.2.1.2 clean fuels and green cars

Kenya is a member of Global Fuel Efficiency Initiative (GFEI) and has continuously made attempts to reduce the number of vehicles with emissions detrimental to the atmosphere.[6]Some

[3]Ibid, 238

[4] National Oil Corporation, The gas yetu, Mwananchi gas project (NOCK, 2018), found on https://nationaloil.co.ke/gas-yetu-the-mwananchi-gas/, accessed on 14/07/2019

[5] Republic of Kenya, National Climate Change Action Plan 2013-2017, found at http://www.environment.go.ke/wp-content/uploads/2018/08/nationalclimatechangeactionplan2013-2017.pdf, accessed on 16/07/2019

[6] Ibid, 198

of the interventions have included setting an age selling for second hand imported cars in the country to eight years, and plans are underway to get the same to below five. The purpose of such settings is to limit the number of cars with unwanted emissions, if the 2.5 million cars on the Kenyan urban roads is anything to worry about. Therefore, importation of fuel-efficient vehicles has potential to reduce carbon emissions, importantly improve mileage refueling times, which translates into less fumes into atmosphere.[7]

To support fuel-efficient vehicles the government recommends thorough inspections of light and heavy-duty vehicles on annual basis to determine the roadworthiness.[8] This in totality speaks to vehicle safety and exhaust tailpipe emissions with a focus to promote cleaner and healthier fuel energy saving vehicles on Kenyan roads.[9]Fuel efficient vehicles initiative is mid-stream intervention that is pointed towards eco-friendly motor technology on Kenyan roads that has less emissions, therefore reduced tailpipe smokes. The government through the Kenya Bureau of Standards is trying to put in place in an operational framework that can enable importation and use of Hybrid Electric Vehicles (HEV).[10]

Realistic estimation provides that hybrid and electric vehicles (VE) on the Kenyan roads are likely to lower the carbon footprint by reducing dependency on fossil fuels consumption by up to 70%. Apart from being pollution averse, HEV and EVs are profiled as needing very little of

[7] Importance of fuel-efficient cars in Kenya, Found on https://carjunction.co.ke/importance-of-fuel-efficient-cars-in-kenya/, accessed on

[8]Tsindi Tineyi Tadius, Green strategies and competitive advantage of automobile firms in Kenya, (University of Nairobi), found on http://erepository.uonbi.ac.ke/bitstream/handle/11295/100008/Tsindi_Green%20Strategies%20and%20Competitive%20Advantage%20of%20Automobile%20Firms%20in%20Kenya.pdf?sequence=1&isAllowed=y, accessed on 14/07/2019

[9]Kanyiva Muindi, Air Pollution in Nairobi Slums: Sources, Levelsand Lay Perceptions, (Umea University Sweden, 2017)

[10] Emmanuel Awuor and Zubahir Hassan, he Viability of Plug-in Hybrid Electric Vehicles in the Kenyan Market: A Strategic Study, (2015), JETP, Vol.5, No.7, 2015

service maintenance as few or nor spare parts are changed.[11] Therefore, policy maker in the country are being encouraged to develop a framework that would see such vehicles on the road with less cumbersome transition from fossil fuel driven to more efficient run engines that are not internally combusted.[12]

3.2.3 Issuance and renewal of emission licenses alongside related tests

Emission licensing has been used as a means through which air pollution is nabbed at the source. This is especially used in industrial parks where various production on different products and services is carried out.[13] The purpose of the emission license in Kenya as provided for under regulation 37 (2), pursuant to schedule III of the Air Quality Regulations[14] is to allow for certain releases into the atmosphere of gases and other pollutants but within an agreed range that is permissible and unable to harm life.

The bigger goal of issuing emission licenses is the recognition to have sustainable development, where industrial production is allowed for as long as the processes of production do not depreciate the value of life and reduces effectiveness of other sectors due uncontrolled emissions. The emission license allows the owner of a production plant to anticipate, plan and acquire technological advances that improve air quality besides being competitive. This can be deduced from the ongoing conflict in the Syokimau area of Machakos County, where 12,000

[11] Kenya Engineer, Kenya dares to switch to electric cars, (January, 2019), found on https://www.kenyaengineer.co.ke/kenya-dares-to-switch-to-electric-vehicles/, accessed on 14/07/2019

[12] Business Daily, The future of cars is electric, found on https://www.businessdailyafrica.com/lifestyle/society/The-future-of-cars-is-electric/3405664-4251114-4ju4scz/index.html, accessed on 14/07/2019

[13] Ayub Macharia, Regulating air pollution emissions into the environment, (September, 2016) found at https://ayubmacharia.com/2016/09/26/regulating-air-pollution-emissions-into-the-environment/, accessed on 14/07/2019

[14] Regulation 37 (2) of the AQR states, "The owner or operator of a facility whose fuel burning equipment causes emission of nitrogen oxides in excess of the limits specified under the Third Schedule shall institute remedial measures recommended under the Part X of the Fifth Schedule."

residents accuse the Endmor Steel Smelting Company to have caused their constant illnesses.[15] It also opens them up to various tests by NEMA, which are important in ascertaining the level of possible air pollution by their activities.

In ascertaining that emissions licenses achieve the purpose for which they are issued, NEMA has proposed and uses four important methods to ensure that air pollution is controlled. These include source testing for the particular license' holder, besides application of meteorological monitoring and ambient air monitoring is an option.[16]

3.3 Preventive and precaution mechanism against air pollution

This section reviews programs and related actions, including standards provided within the law to ensure that air is guarded from pollution from the many likely sources. The researcher focuses on air monitoring and auditing, importation and customization of technology as well as piloting of alternatives in public transport.

3.3.1 Understanding the extent of air pollution

This section speaks to measures taken by government to ensure that cautious air pollution initiatives and mitigations are evidenced. This depends on the capacity to have relevant technology, expertise and equipment. Furthermore, the need to have enough of the three aforementioned in order to ensure that inspection, auditing and

3.3.1.1 Monitoring of air quality

In 2015 the government through the partnership with United Nations Environment Program (UNEP) launched the monitoring of the quality of air in Kenya. Air monitoring is considered

[15] John Muchangi, Lungs have had enough: Inside Syokimau's battle against air pollution, (The Star, 27th May, 2019), https://www.the-star.co.ke/news/big-read/2019-05-27-inside-syokimaus-battle-against-air-pollution/, accessed on 14/07/2019

[16] Section 44 (2) of the AQR

to be a supportive mechanism for the Air Quality Regulations (AQRs) in place since 2014 that addresses both mobile and immobile sources of pollution. Further, efforts by nonstate actors and private sector have led to the installation of equipment to monitor air pollution, especially in Nairobi.[17] The main goal is to generate and access real time data showing the degree of contaminated air in Kenya.

The significance given to weather updates should be similar to appraisals regarding the degree of impure air in the country. The government has since realized this and allowed a number of players into this sector to undertake various and progressive air monitoring initiatives. For instance, the Vaisala group has in the recent past installed a compact environmental station consisting of AQT 420 air transmitter and a WXT 536 weather transmitter at Kenya Meteorological Department in Nairobi. The purpose of this is to draw understanding the temporal and spatial variations of air quality in the region where such equipment is mounted.[18]

However, it is appreciated that such equipment is expensive and efforts to have cheap but reliable technology imported to assist Kenyans, many of whom are poor to have a basis of making decisions as regards where to stay, persists. A case in point are findings provided out of a study by Chasant Muntaka, which indicated that pollution of air is prominent and deadlier in Kariokor market, Baba Dogo and Donholm in Nairobi.[19]

[17] Ministry of environment and forestry, Real time air monitoring launched, (September, 2015), found at http://www.environment.go.ke/?s=when+was+the+air+monitoring+launched+in+Kenya, accessed on 14/07/2019

[18] Vaisala, Air quality monitoring in Nairobi, Kenya, (Vaisala, 2018), found at https://www.vaisala.com/en/case/air-quality-monitoring-nairobi-kenya, accessed on 14/07/2019

[19] Muntaka Chasant, Air pollution in Kenya: causes, effects and solutions, (March 3, ATCMASK, 2019), found on https://www.atcmask.com/blogs/blog/air-pollution-in-kenya, accessed on 08/07/2019

3.3.1.2 Environmental audits with a bias to air pollution

Environmental audit has been captured as an organization's means of gathering environmental information to ascertain compliance with set regulations and standards. The basis upon which environmental audits is leveraged is the EIA often carried out at the beginning of a project or investment. There are two types of audits used in the country, which comprise; compliance or control audit: and self or system audit.

3.3.1.2.1 Compliance or control audit

Several compliance audits have been carried out by NEMA in particular where complaints are received from people purporting to be affected by activities of certain companies or investments.[20] An example is a collaboration of NEMA and Kenya Meteorological Department in which a joint environmental audit was carried out in Kitengela township, part of Nairobi's metropolis to determine levels of corrosive air pollutants. The auditors monitored and documented ambient pollutants levels to quantify the PM10 and PM2.5 concentrations, including registering other related gaseous pollutants such as NO, NO2, O3, SO2 and CO. The audit revealed that there were high levels of PM10 and PM2.5 especially early morning and late evening.[21]

3.3.1.2.2 Self or system audit for air pollution in Kenya

These kinds of audits are often inspired by the desire to remain compliant to set laws, regulations and policies. The compliance addressing air pollution control is based on section

[20]Fuchaka Waswa, Kambona Ouma and Caleb Mireri, Principle and practices of environmental auditing, in Environment and sustainable development, Chapter 18, found at file:///Users/pm/Downloads/Principles%20and%20Practices%20of%20Environmental.pdf, accessed on 14/07/2019

[21]Zablon Shilenje, et al, Ambient Air Quality Monitoring and Audit over Athi River Township, Kenya, (2015), 3, (8), IJSRES, p. 0291

78 of the EMCA and Air Quality Regulations, which may have regularized environmental practices considered palatable to people, animals and general environment. System audit is conducted by the specific institution or organization in order to create, proliferate and sustain improved environmental management practices. This calls for institutions establishing Environmental Management Systems (EMS).[22]

On matters of air pollution, a number of tools are required to follow through systems capacity to comply with air quality standards. Therefore, the tools which may include infrastructure monitoring program (IMP) are part of the air pollution management systems such as wet and dry scrubbers[23]of an institution or company. Such tools often rely on collection of specific information on processes of production.[24]

The self-audit system is coupled with ad hoc monitoring carried out by NEMA. While this is a good approach to avoid cover up by likely air polluters, there are proposals indicating the need to generate air pollution atlases to promote more frequent and progressive evaluations. The atlas is likely to help NEMA profile pollution levels within a specific region.[25]

Air Quality Regulations (AQR) among other attendant laws and policies points to practices of self-regulation. In an ideal situation, this is good practice because the players within sectors develop practice frameworks that check internal operating standards and keep those responsive to their unique business ventures. However, according to Kamugi Nderitu, the Supply Chain Director at Kenya Breweries Limited, self-regulation is a commitment that businesses must

[22]Ibid
[23]Wet and dry scrubbers, are add-on auxiliary equipment fitted across the flue gas stream ostensibly to remove solid particles and or gaseous metals from incineration processes, but can be redesigned to
[24] Air management systems in Kenya, found on https://yellow.co.ke/plenser-ltd/blogs/air-pollution-management-systems-in-kenya, accessed on 15/07/2019
[25]Ibid, 260

make to reduce air pollution in their operation sites and across value chains particularly in the communities they serve with a view to institutionalize practices to sustainable business models. He further suggests that such commitment may translate into high initial investment costs in clean and renewable energy but in the long run minimize indirect and direct emissions, in an apparent adoption of environment sensitive culture.[26]

3.3.2 Modernizing the public transport system

There have been attempts to reduce air pollution from motor vehicular sources. Part of this has been proposal to import fuel efficient vehicles as well use of clean fuels amongst others. This section speaks to the various mechanism in the transport system that have been tried.

3.3.2.1 Car free days in urban cities

In an attempt to ensure that Kenyan roads have reduced traffic jam a number of county governments such as Nairobi have tried to implement car free days targeting private car owners. This approach is meant to allow only Public Service Vehicles (PSVs) in to the central business district (CBD) and into designated areas. An assumption that points to reduced presence of some air pollutants between 20% and 75% partly motivates implementation of car free days.[27]

For the case of Nairobi, where it was tried and postponed for reasons that included poor planning, absence of public participation in arriving at the decision, besides demonstration of ill coordination between different agencies of the national and county government, car free days were scheduled in anticipated planning to decrease the concentrates of particulate matter

[26]Kamugi Nderitu, Why industry must be on the frontline to fight air pollution, (Business Daily, 5th June, 2019), found on, https://www.businessdailyafrica.com/analysis/ideas/Why-industry-fight-air-pollution/4259414-5146344-kk62sz/index.html, accessed on 08/07/2019

[27] Nairobi planning a car free day program to ease traffic congestion (5th July, 2018), found on https://qz.com/africa/1321403/kenya-nairobi-to-go-car-free-to-beat-traffic-congestion-matatus/

estimated to be 11.17 times higher on curb in the Central Business District (CBD) during the day.[28]

Kenya can learn from other jurisdictions around the world where different strategies especially in cities have been used on air pollution control. A case in point are the Norwegians of Oslo have dedicated their attempts to arrive at zero emissions by way of reward. For instance, members of the public are motivated to transit to fuel efficient and electric cars with prices lowered or traded in. Similarly, drivers with such vehicles are privileged to tax rebates, access and use of special lanes, and tend to enjoy free or subsidized travel on toll roads and public ferries, besides getting privileged municipal parking.[29]

The experience of Oslo points to the comprehensive approach if air pollution is to be controlled. It is said that since 2017 pedestrians and cyclists have been given preferential treatment over private car owners. Car free spaces have been created and 2019 seems to be the target to reach 1.3 km^2 of the city. The acceptability to this scheme has been the guarantee that such space is re-purposed and used by communities, organizations, businesses and other groups for everything such as outside dining, cultural activities, playgrounds, bicycle stands or art platforms for recreational times. This is besides the establishment of a climate smart budget, which is accessible by plants and organizations that demonstrate effective efforts to reduce carbon gas emissions. This is supported by a Business for Climate Network since 2016 whose purpose is mutual integration of community proposals into development of air pollution free

[28]Patrick Kinnely, et al, Traffic impacts on $PM_{2.5}$ air quality in Nairobi, Kenya (2011) ESP, Vol. 14 Issue 4, p. 369

[29]UN Environment, Oslo takes bold steps to reduce air pollution, improve livability, (2019, UN Environment), downloaded from https://www.unenvironment.org/news-and-stories/story/oslo-takes-bold-steps-reduce-air-pollution-improve-livability, accessed on the 17/02/2019

technologies, market strategies and air quality management. Purpose is to ensure that come 2020, Oslo would be 50% free off greenhouse gas emissions.[30]

3.3.2.2 Re-engineering the public transport system

Conclusions from many studies such as those carried out by Samson Mukaria, Michael Gitari and Opondo Keyah indicated that cleaner transport system can reduce deaths caused by air pollution, as well as related illnesses which often manifest as asthma, lung cancer, chronic bronchitis and sometimes pneumonia. Way back in 2012 it was suggested that Kenya was likely to save shillings 115 billion often lost to medical and health care for air pollution diseases, if the transport system is reformed.

In this regard, proposals have been made to import soot free buses to reduce the number of public service vehicles producing black smoke. Works have begun in Nairobi that will enable the introduction and running of a Bus Rapid Transit (BRT).[31] Some of these preparatory initiatives include; establishing committees that manage traffic, automating bus terminuses and strengthening human powered travel. This in addition to upgrading of major roads in the city of Nairobi to create special lanes on Lang'ata, Mombasa, Thika, Waiyaki and Jogoo roads from which the BRTs will ply uninterrupted.[32] The purpose as observed by some experts such as

[30]Ibid

[31] Bus Rapid Transit (BRT) is also called a **busway** or **transitway**. It is a bus based public transport system designed to improve capacity and reliability to a conventional bus system. It consists of roadways dedicated to buses, giving them priority at intersections where interaction with traffic happens. The transitway emphasizes features to reduce delays caused by passengers boarding or leaving buses or purchasing fares. BRT aims to combine the capacity and speed of a metro with the flexibility, lower cost and simplicity of a bus system.

[32] Manoah Espisu, (former spoke's man of the government of Kenya), quoted "39 new buses, car free days planned to reduce jam in Nairobi", found on https://www.standardmedia.co.ke/article/2001277014/39-new-buses-car-free-days-planned-to-reduce-jam-in-nairobi, accessed on 15/07/2019

Ken Gwilliam and Masami Kojima, is to improve public transport in a way that it discourages most car owners from using theirs, in turn reducing the amount of emissions.[33]

3.3.2.3 Commuter train services in major metropolis

There have been plans to add onto the existing commuter train services, which transports people from the CBD of Nairobi to the outskirts like Kitengela, Athi-River, Ruiru and Kikuyu.[34]Going by the projections made by the Nairobi Metropolitan Services Improvement Plan (NaMSIP), improving and expanding the train service system as points to the reduction of motor vehicles on the road, whether of private or public nature, primarily scaling down on the amount of fuel burned on the roads, consequently less fumes into the atmosphere,[35]and reduced burden of health budgets.[36]For instance, one train pulls over fifteen wagons with carrying capacity of between 50 and 100. This if calculated against size of public transport in the country can be more than 60 twenty-five-seater minibuses technically withdrawn from roads.[37]

3.3.3 Physical planning and air pollution

Environmental and physical planning experts have indicated severally that impact of air pollution can be reduced by good planning on how settlements are designed and spread. In reference to the national policy on land use in Kenya, air pollution can sometimes be

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[33] Ken Gwilliam, Masami Kojima, and Todd Johnson, Reducing air pollution from urban transport, (The World Bank, 2004), found on http://www.esmap.org/sites/default/files/esmap-files/urban%20pollution%20entire%20report.pdf, access on 15/07/2019

[34] Stellar Murumba, Nairobi commuter train system: In the shadows of lunatic express, (May 17,, 2019), found on https://www.theelephant.info/data-stories/2019/05/17/nairobi-commuter-train-system-in-the-shadows-of-the-lunatic-express/, accessed on 15/07/2019

[35]Kitengela gets commuter train to ease traffic jam on Mombasa road (December 13, 2018), found on https://www.businessdailyafrica.com/news/counties/Kitengela-commuter-train-ease-jam-Mombasa-Road/4003142-4893382-k0bvj1/index.html, accessed on 15/07/2019

[36]Interlink road, rail costs to reduce health burden, (July 9th, 2019) found on https://www.businessdailyafrica.com/lifestyle/fitness/Interlink-road-rail-costs-to-reduce-health-burden/4258372-5189430-e093giz/, accessed on 15/07/2019

[37] Kenya Railways adds 40 coaches on city-Ruiru route, (June 24, 2019), found on https://www.nation.co.ke/business/Kenya-Railways-adds-40-coaches-on-Nairobi-Ruiru-route/996-5170232-fyedr0z/index.html, accessed on 15/07/2019

proliferated by the way land is planned for and used.[38] If, for instance physical planning points to concentration of industries in a particular area or town, then migration of people to such places will be higher, consequently sprouting of formal and informal settlements. Therefore, good planning is not only essential for infrastructure development but significant in managing health matters associated with rapid growth of urban centers.[39]

3.3.3.1. Decongesting Cities and urban center

Institute of Economic Affairs has observed that devolution is a political mechanism to decongest cities and urban centers which is strategic among actions that purpose to address environmental matters including air pollution as at schedule IV of the Constitution. The fact that county governments are constructed as fully-fledged institutions of governance, with clear county planning and infrastructure development mechanisms, there is an opportunity to reduce concentration of air pollution in one place such as Nairobi or Kisumu.[40]In the same study or analysis, a mention is made of the fact that the law to devolve environmental governance in Kenya is inadequate especially stating how the counties are to be re-structured to act against pollution.[41]

There have been suggestions to the extent of re-designing some cities like Nairobi and Mombasa to reduce congestion. In fact, the trials made to have car free days and sometimes

[38] Ministry of Lands and physical planning, National land use policy in Kenya, (seesional paper N0. 1of 2017) found on, https://lands.go.ke/wp-content/uploads/2018/11/SESSIONAL-PAPER-NO.-1-IOF-2017-ON-LAND-USE.pdf, accessed on 15/07/2019

[39]Mark Nieuwenhuijsen, Urban and transport planning, environmental exposures and health-new concepts, methods and tools to improve health in cities, (March 8, 2016) EH, 15,

[40]Asmaa El Messnaoui, Dorcas Omowole, Loyce Mrewa and Rhea Vi Silvosa, University of Notre Dame and Institute of Economic Affairs, A political economic analysis for devolution in Kenya, (2018), found on file:///Users/pm/Downloads/1547728416.pdf, accessed on 15/09/2019

[41]Ibid

unprecedented raise in parking fee(s) is to drastically deal with question of overcrowding. Fiona Rajes et al suggests that decongesting cities must not only focus on motor vehicle entry and exit but rather focus on how proper housing schemes, flexible operational time of work hours, paved walkways for people and cycling, besides improved security systems, as well objectively distributed transport instruments especially "bodaboda" in the country amongst others could improve overall war against air pollution.[42]

Cascading into Fiona Raje's thoughts is the World Bank funded Kenya Slum Upgrading Program (KENSUP). While elimination of poor living environments is the motivation of the KENSUP, other auxiliary benefits include installation of better waste management systems, enhanced spacing of houses and inclusivity in the mainstream sewerage disposal infrastructure. These aspects of environmental management interlink with the need to have clean breathable air.[43]

Closer to Raje's school of thought is work done by Jacqueline Walubwa, who from her work on the slum upgrading program found out that the structure and spacing of the housing structures within the re-designed areas reduced air pollution considerably. The provision for designed areas to dump and process solid waste with less emphasis of open burning has also reduced concentration of emissions from such sources.[44] Other relevant thoughts come from Edwine Ochie'ng who reinforces that air pollution were secondary thoughts consolidated under

[42]Fiona Raje, Miles Tight, Francis, Pope, Traffic pollution: A search for solutions for a city like Nairobi, (2018, December, Science Direct), 107, downloaded from https://www.sciencedirect.com/science/article/pii/S0264275117312933, accessed on 17/02/2019

[43] Graham P. Alabaster, UN-Habitat, Kenya slum upgrading programme, Strategy document, (United Nations, 2008), found on file:///Users/pm/Downloads/2602_alt.pdf, accessed on 15/07/2019

[44] Jacqueline Walubwa, "Kenya slum upgrading programme"; An Analysis of Kibera Integrated Water, Sanitation and Waste Management Project, (University of Nairobi, 2010).

environmental improvement of solid waste disposal within the slum upgrading plans, yet the state of indoor pollution improved.[45]

Leah Oyake- Ombisgives more insights on the importance of handling solid waste in a better way. Ombis notes that in the many counties such as Nairobi, Kisumu and Nakuru solid waste disposal remains a big challenge, although methods such as reuse, recycle, recover (repair) and reduce (4R) are selectively used and largely are informal. Leah Oyake-Ombis makes a claim that where 4R has been employed consistently has resulted into less incidents of open burning, which of essence reduces gaseous emissions into the atmosphere.[46] In support of Oyake-Ombis's findings are proposals by UNEP that indicate the ban of plastic bags reduced fumes from plastic by 12% if the 40% of solid waste burned in open places.[47]

3.3.4 Other measures taken to improve quality of air

In April 2018, in a workshop organized by Newton Fund stakeholders, experts and communities insinuated that Kenya still lacks mechanisms to control air pollution. They in particular singled out lack of appropriate infrastructure to support the relevant pollution management system.[48] However, note was made of the country's effort to institute incentives such as use of environmental tax, zero rating of equipment and technologies that are less air polluting. Similarly, there has been exception from Value Added Tax on sealed tanks made of

[45]Edwine Ochie'ng, Factors influencing the implementation of Kenya Slums Upgrading Programme: a case of Kibera Slums in Nairobi County, (University of Nairobi, 2011)

[46]Ombis Oyake, Awareness on environmentally sound solid waste management by communities and municipalities in Kenya, A report for the project Sound Chemicals Management Mainstreaming and UPOPs reduction in Kenya, Ministry of Environment and Natural Resources (UNDP and Government of Kenya, 2017)

[47] UNEP, Plastic bag bans can help reduce toxic fumes (May 2nd, 2019), found on https://www.unenvironment.org/ru/node/24826, accessed on 16/07/2019

[48]Duncan Mboyah, Policies to curb air pollution needed, (2018, Science Africa), downloaded from https://scienceafrica.co.ke/policies-to-curb-air-pollution-needed/, accessed on the 17/02/2019

plastic to meant to produce biogas as actions purposed to encourage production of green energy.[49]

Similarly, the Manufacturing society in the country Kenya Association of Manufacturers (KAM) is a step ahead and gives incentives to her members on clean energy to reduce air pollution. Through this program an Energy Management Award has been established to recognize and reward companies with major sustainable gains in energy efficiency. This is purposed to generate and embed a culture promoting acquisition and conservation of efficient energy. This is a market driven approach to improve competitiveness of production and still offer employment opportunities without compromising the quality of air.[50]

Has public education and legal awareness been part of the interventions taken by state and nonstate actors with interest for clean air. There is myriad documentation to indicate public learning and sensitization, but only to an extent and disjointed. Past studies by Eunice Omanga[51] and Muthui Thomas[52]divulge awareness and sensitization of air pollution being segmented and shared through civil society organizations with periodic funding or support. This approach lacks long term effect and sustainability and therefore only creates pockets of literacy on air pollution matters.[53]

[49]Prisca Musibi, Environmental tax a step in the right direction, (2018, Business daily), downloaded from https://www.businessdailyafrica.com/analysis/ideas/Environment-tax-a-step-in-the-right-direction/4259414-4541508-6pjfio/index.html, accessed on the 17/02/2019

[50]Kenya Association of Manufacturers, Policy and Sustainability report, (2017), downloaded from file:///Users/pm/Desktop/ERIC%20THESIS/KAM-Policy-Sustainability-Report-2017.pdf, accessed on the 17/02/2019

[51]Ibid, 57

[52]Muthui Thomas, An assessment of the level of awareness/knowledge and practices of environmental management in schools in Kenya; A case study of public secondary schools in Nairobi County, (University of Nairobi, 2012), found at http://erepository.uonbi.ac.ke/handle/11295/11520, accessed on 19/07/2019

[53] SEI, Air pollution beyond safe limits in Nairobi's informal settlements, finds study, (February 15, 2016), found at, https://www.sei.org/featured/air-pollution-beyond-safe-limits-in-nairobis-informal-settlements-finds-study/, accessed on 19/07/2019

Research and knowledge development have also become effective tools to deal with air pollution. Several researches have made attempts at the sociology of air pollution in Nairobi, following the uniqueness of the city as an industrial hub, transport center and a host to the United Nations Environment Program (UNEP), besides being the capital city of Kenya. For instance, the Stockholm Environment Institute has run studies linking rapid industrial development, high rural-urban migration and unresponsive service facilities and provisions to growing air pollution.[54] The biggest question, however, has been the difficulty to translate research findings into policy and practical mitigations.

3.4 Judicial mechanisms addressing air pollution

Kenya enjoys a multiplicity dispute handling mechanism. Air pollution can attract both civil and criminal procedures, similarly get attention through arbitration by strength of Article 159 of the Constitution. This section therefore, canvases on how arbitration and litigation has been used in an attempt to make Kenya pollution free from air contamination, whenever clean air regulations, policies and laws are flouted.

3.4.1 Criminal approaches in dealing air pollution

The court has been an avenue through which environmental matters have been settled. According to the EMCA criminal proceedings either lead to jail term or fine.[55] This is stipulated at section 137 to 145 of the EMCA, and partly under the Penal Code at sections 175 (1) for common nuisance[56] as well as 193 on repugnant smells.[57] Similar provisions have been given

[54]Citizen science and Air Pollution Monitoring, found at https://www.youtube.com/watch?v=26RtAcLUjE0, accessed on 15/09/2019
[55] Wilson Koriri, Environmental crime management in Kenya, (Institute of Diplomacy and international studies, University of Nairobi, 2013).
[56] Government of Kenya, Penal Code, Section 175 (1)
[57]Government of Kenya, EMCA, Section 137 – 145, (1999)

under the Air Quality Regulation framework. Several sections have been employed in a court of law and three examples will be given to demonstrate such application.

Section 144 read together with section of 145 of the EMCA has been applied on matters of air pollution. In the case of *Republic v National Environment Management Authority & another Ex-Parte Philip Kisia& City Council of Nairobi*, it was alleged that on diverse dates between 13th June and 28th September 2011 at Enterprises and Lunga-lunga Road in Makadara District of the then Nairobi Province, the accused being the Town Clerk of the City Council of Nairobi, contravened EMCA. The accused failed to collect domestic waste from points of disposal, besides demonstrated less drive to carry out due diligence on efficiency, hence predisposing the county to poor enforcement. A second count noted that on the 13th of September 2011 at City Hall within Starehe District of the Nairobi, the 1st applicant being the Town Clerk of City Council of Nairobi failed to submit to a legitimate order issued by an environmental inspector, Sophie Mutemi seeking him to stop illegal dumping and restore environment along Enterprise road. The court held ruled that the first applicant was in law to challenge the basis for his conviction.[58]

On the overall, a number of offenses that attract criminal proceedings have been created under the EMCA, such as blocking environmental inspectors from accessing premises and doing their work, failure to partake EIAs, general mishandling of hazardous wastes including disposal at section 141[59] into environment causing pollution and noncompliance to operating standards for clean air.[60]

[58]Republic v National Environment Management Authority & another Ex-Parte Philip Kisia & City Council of Nairobi [2013], eKLR
[59]Ibid, (n, 57)
[60]David Kamweti, Deborah Osiro and Donald A. Mwiturubani, Nature and extent of environmental crime in Kenya, (Monograph 166, 2009)

3.4.2 Civil approaches in air pollution

Part two of the EMCA pursuant to Article 22 of the Constitution gives right and rise to civil matters before court, on matters regarding non or partial implementation of bill of rights, especially the canvassing of[61] article 42 on quality environment for all people resident in the country. The section 22 further provides for individual and class matters by a person who makes claim of some aggrievement. Similarly, it does point to the application of public interest litigation[62] for matters whose eventual net effect consumes the interests and rights of many in a given population or jurisdiction.

As affirmed by Jacktone Ojwan'g, part two of the EMCA demands protection of environment to actualize Article 42. People's duty separate from enjoying the rights, is to file matters at the Environment and Land Court (ELC) seeking particular prayers, for which the following informs of writs may be provided: an injunction to inhibit, stop or suspend any act of error environmentally detrimental: a writ compelling any relevant employee of government and related agencies to take actions to help cease or disallow any act or lapse that is environmentally injurious: a writ demanding for a living activity undergo environmental audit in accordance with EMCA: a writ compelling persons (including veiled companies) proved to be polluters to reinstate the abused environment to the nearest possible condition as it were originally before damage visited: an injunction directing victim reparation affected by the act and result of pollution, including compensation of economic and social loses in their broadest sense.[63]

Jurisprudence to demonstrate the civil approach is found in the case of *Koome Mwambia & Another v. Deshun Properties Company & 4 Others*, by which the applicant claimed that the

[61] Constitution, Article 22 (1) (2010)
[62]Ibid
[63]Ibid, (n, 57) Part II section 1-3

erection of single dwelling flats in the region was not only against several statutes including EMCA, AQR, Physical Planning Act and Urban Areas and Cities Act, but was in contravention for his right to clean air and amiable living environment, because the project had several aspects of pollution.[64] While the court did not grant prayers to the petitioner, the submissions by parties and the orbiter dicta applied by the court evidences availability of civil approaches to deal with air pollution.[65]

3.4.3 The frequency of using criminal and civil procedures for air pollution matters

General consensus is that the Environment and Land Court (ELC) has not been popular destination for settling air pollution disputes or matters. This position though, is contestable due to the fact that public information is scarce with regard to the number of cases litigated upon on air pollution. This situation is attributed to a number of factors. First, there is dire need for development of thematic information as to bring out precedencies, decisions and orbita dicta used in cases to enable development of jurisprudence to demonstrate the court as an appropriate avenue to deal with air pollution.[66]

Other issues that reduce the frequency of matters before the ELC as indicated by writers such as Samson Okon'go include scanty information and less knowledge in public domain about the work of ELC and likely effectiveness.[67] This is worsened by the old time believe existing for a considerable long time that the court system is not only slow due innumerous injunctions and adjournments but does not dispense justice to those considered poor or with less resources. Similarly, the litigation processes can require hefty funding, therefore removing it as an

[64]ELC Petition No. 1433 of 2013, Environment and Land Court, Nairobi
[65]Ibid
[66]Angote Oscar, The role of the environment and land courts in enforcing environmental law: A critical analysis of the environmental caseload, (University of Nairobi, 2018)
[67] Samson Okon'go, Environmental adjudication in Kenya: A reflection on the jurisdiction of the Environment and Land Court, (A presentation made to the symposium on environment and adjudication in the 21st Century, made in Auckland, Australia, April 11th, 2017) found https://environmental-adjudication.org/assets/Uploads/General/Okongo-PPT2.pdf, accessed on 16/07/2019

instrument to be accessed and used by the poor residing in regions where air pollution is prevalent.[68]

There is a presumption of inadequate legal awareness and literacy in Kenya being a big challenge if inferences are made from the more than ten annual events of pro-bono legal service weeks carried out by different actors in the country, particularly Law Society of Kenya, the Judiciary and other nonstate agencies such as Legal Resources Foundation Trust[69] and Kituo Cha Sheria. Findings from some of these service weeks indicate that seven out of every ten members of the public do not have any idea on what to do to move the court in listening to a matter.[70]

Another issue is the difficulty to prove causation especially in civil matters, where air pollution has taken long to be detected. This can be found in the matter of *Charity Mpano Ntiyione v. China Communications Company Ltd and National Environment Management Authority*,[71] the plaintiff alleged that works carried out by the first defendant under a license given by the second, among other implications continued to cause discomfort and exposed her family to health inexpediencies unnecessarily due to the uncontrolled dust occupying the air, buildings, plants and vegetation in her compound. As the one moving the court, the burden of proof was her responsibility.

[68]Legal Resources Foundation, National Council on Administration of Justice & RODI Kenya, A report on the Audit of the Criminal justice system in Kenya, (2017), found at www.lrf-kenya.or.ke
[69]Legal Resources Foundation Trust is a nonprofit making institution working to improve legal aid to the indigent established in 1993 in Kenya. Details can be accessed at www.lrf-kenya.or.ke
[70] Legal Resources Foundation, Service weeks' report for Eldoret, Lamu and Kilifi in conjunction with National Council on Administration of Justice (NCAJ), (2018), found at www.lrf-kenya.or.ke, accessed on 16/07/2019
[71]ELC CASE NUMBER 235 OF 2017, in the Environment and Land Court Sitting in Kajiado. (2017), eKLR

Although the law is clear on procedure to claim damages and how to gain some level of restitution under nuisance, negligence and trespass, there is often cited the difficulty to assign culpability. To prosecute civil matters with regard to air pollution is best guided by the principles under the concept of nuisance.[72]Tracing the threshold set in *Donoghue v. Stevenson in 1932*, one gets to understand how it can be very difficult to proof intention to harm, causation and proximity hence the near-hollowness on the concept of negligence and neighborliness in air pollution matters. The take home of this case, is how the principle of foreseeability of damage may be invited and consideration of fairness, justice and reasonableness in the eyes and ears of the court, while imposing duty of care to a defendant. This represents and resonates with many Kenyan scenarios of air pollution.

Experience from other countries demonstrate that litigation expand opportunities tending to arrive at air pollution control. In the western world in particular Germany and the United Kingdom Public Interest Litigation has been employed by environmentalists, where the state and its agencies have demonstrated lethargy to address air pollution. In the matter of *R (on the application of Client Earth v Secretary of State for the Environment, Food and Rural Affairs (Respondent)*, the Supreme Court of the United Kingdom, directed the respondent prepare and consult widely on the substitution of draft air quality plans especially in the regions and clusters set out in schedule 1 to this order in accordance with Article 23 (1) of the European Union Directive 2008/50/EC and the said public consultation be carried out for a minimum of forty days.[73]

[72]Okofh Ogendo, H. W. O., "The Juridical Framework of Environmental Governance." In Okoth Ogendo, H. W. O. & G. W. Tumushabe (eds) Governing the Environment pp. 41-62 at 50

[73] R (on the application of Client Earth v Secretary of State for the Environment, Food and Rural Affairs (Respondent), (UKSC, 2015)

However, it is important to note that both criminal and civil processes are faced with challenges though, if well-handled opportunities abound. While the ELC is an opportunity to entertain air pollution control suits, it is indirectly affected by a number of drawbacks such as serving communities with scanty environment and legal information and as discussed by experts such as Jacktone Ojwan'g,[74]Samson Okong'o, and Benjamin Barczewski yet its best poised to guide settlement of air pollution matters. In accordance with ELC Act, the court is mandated to adjudicate matters by applying appropriate environmental principles such as precaution, polluter-pays, public participation and sustainable development. For instance, the matter in *Patrick Kamotho Githinji& 4 others vs Resjos Enterprises limited & 4 others*, the verdict of the court affirmed violation on the part of the respondent based on the petitioner's right to quality environment, on three grounds: a) the respondents did not provide evidence to proof that public participation was undertaken when EIAs were carried out, besides not adhering to the principle of "in dubio pro natura:" b) the construction of the road had led to irresponsible removal of tree cover which denied the petitioner access to fresh air and shed: and c) respondent were unable to arrest the dust that polluted the air reducing its breathable attributes.[75]

Therefore, the court would become and remain a preferable forum with a few changes can be carried out. First is the need to work out an improved legal literacy program that could be accessed from several media platforms to enlighten the public to appreciate their role at article 70 pursuant to article 22 of the constitution. Second, where issue of proof of culpability is raised the courts can borrow from other jurisdictions and flip the burden of proof to the

[74]Jacktone Ojwang, The Role of the Judiciary in Promoting Environmental Compliance and Sustainable Development, (2007), available at http://www.kenyalaw.org/Downloads_Other/ojwang_jud_env.pdf, accessed on the 19/10/2018

[75]Patrick Kamotho Githinji & 4 others (suing for and on behalf of aggrieved residents of Muthurwa Estate within Nairobi County) v Resjos Enterprises Ltd & 4 others [2016] eKLR

suspected air polluters as was the case in the matter of *Vellore* case.[76] This as, asserted by Maurice Odhiambo, among other roles should place the court in leadership to develop jurisprudence that is necessary to deal with air pollution matters going forward,[77] and eventually reduce the effects of the misconception that ELC may not be forums to deliberate for environmental matters as intoned by Kaniaru Donald,[78]even though its mandate is clearly stated at Section 13 (3) of the ELC Act[79] pursuant to Article 162 of the constitution.

For matters to be raised in court or any other tribunal evidence must be adduced. Furthermore, for policy, programs and mitigations to reduce air pollution to be responsive relevant data must be availed. Yet this is a challenge. Since 2014 upon the launch of the Air Quality Regulations, data collection has not been systemic, but ad hoc, with different players doing it for their own projects. Notwithstanding, data collection and interpretation is a major component in information management in planning and general governance for clean air. To address air pollution according to works of Pryanka de Souza, real time data on the condition of air particularly gathering concentrates of fine particulate matter and dust, including levels of emissions.[80] This is only possible is the country is able to afford and install equipment and technology that can aid in such collection of data. Second, there is an imputation that such equipment and technology require relevant personnel to handle in order to gather relevant data. This is an opportunity for the institution(s)with mandate to protect air from pollution to acquire, build and strengthen expertise and know how.[81]

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[76] The special burden of proof in environmental cases, Auburn University, found on https://cla.auburn.edu/envirolitigators/introduction-to-the-enviro-litigators/law/concepts-and-processes/the-special-burden-of-proof-in-environment-cases/, accessed on 16/02/2019

[77]Odhiambo Maurice, The role of courts in environmental management: A case of Kenya, (University of Nairobi, 2003)

[78]Kaniaru Donald, Environmental law courts and tribunals: The case of Kenya

[79]Environment and Land Court Act, Section 13 (3)

[80]Ibid, (n, 57)

[81] Stockholm Environmental Institute (SEI), Nairobi locals empowered to tackle air pollution, (April 15th, 2019), found on https://www.sei.org/featured/locals-nairobi-act-air-pollution/, accessed on 18/07/2019

Policy makers and implementers are sometimes torn between sustained economic development and concern for air pollution. Sitati Benjamin has alluded to this difficulty.[82] There is an opportunity however in Article 10 of the Constitution that highlights sustainable development as a principle of good governance in Kenya.[83] Therefore, developing a hybrid investment regime where sustainable development speaks to green energy, importation of technologies and models that create employment is such sectors that reduce opportunities for obnoxious emissions, dust and particulate matter can help stunt the growth of air pollution.[84]

Economic development comes with challenges especially air pollution amongst other environment threatening possibilities. Quite a number of interventions that range from improved physical planning, decongestion of urban centers, introduction of non-motorized pathways seen in most counties, launch of solar driven lighting systems and adoption of fuel-efficient cooking stoves amongst others have been tried.[85] While these are good opportunities to reduce presence and impact of air pollution, a more organized approach, may be through a comprehensively thought-out implementation framework based on state and nonstate partnerships would help structure such well-meaning initiatives. Nevertheless, there prevalence of nonprofit making in these sectors whose interventions can be harnessed and plugged into a comprehensive state managed clean air program.[86]

[82]Ibid, (n, 61)
[83]Ibid, (n, 49)
[84] DW, Kenya: Solar motorcycles take on Nairobi's smog, found on https://www.dw.com/en/kenya-solar-motorcycles-take-on-nairobi-smog/a-46308817-0, accessed on 19/07/2019
[85]Helen Simiyu, Environmental quality, trade openness and economic growth: An implication of the environmental Kuznets curve, (University of Nairobi, 2015).
[86]Adeladza Kofi Amegah [a] & Jouni JK Jaakkola, Household air pollution and the sustainable development goals, (World Health Organization, 2016), found at https://www.who.int/bulletin/volumes/94/3/15-155812/en/, accessed on 19/07/2019

Success of many of the approaches require robustness of auxiliary services or sectors such as an effective taxation regime encouraging green energy, availability and accessibility of information, public participation and technical partnerships for testing and validating efficacy of technologies and equipment. This, as shared by Columbia Earth Institute and Gothenburg University of Sweden' studies alongside University of Nairobi, air pollution information is largely missing from the public space.[87] Therefore, it becomes difficult to proliferate and replicate technologies as well as mitigations that are effective. There is an opportunity for instance on how non-motorized transport can be enhanced with users providing proposals and design for movement pavements.[88]

Similarly, mitigations done by institutions at the county and national level are not well coordinated. A number of counties have policies and laws on clean air like Kisumu,[89] Turkana and Nairobi. Others have begun non-motorized transport framework, while others are making attempts to handle solid waste in a way that reduces air contamination. Considering that air pollution tends to assume universality of effect and is likely to have a transboundary nature, there is need to have a more centralized approach in order to integrate standards provided for in the AQR. Experience from other jurisdictions such as Germany and United Kingdom point to the need to have an oversight mechanism that works. A case to note was the European Union asking Germany to work on their air pollution, which seemed especially in Stuttgart and Dusseldorf to contain extremely higher levels beyond prescribed threshold.[90]

87Michael Gitari, Air you breathe in Nairobi may kill you, (Daily Nation, 15 May, 2015) https://www.nation.co.ke/counties/Air-you-breathe-in-Nairobi-may-kill-you--says-research/1107872-2651584-grng29z/index.html>_accessed on 29/06/2019

88 UNEP, Kenya prioritizes non-motorized transport to enhance road safety, found on https://www.unenvironment.org/news-and-stories/blogpost/kenya-prioritizes-non-motorized-transport-enhance-road-safety, accessed on 19/07/2019

89County Government of Kisumu, Kisumu County Environment Policy, (2019), https://www.kisumu.go.ke/wp-content/uploads/2019/04/Kisumu-CEM-policy-2019-1.pdf, accessed on 20/07/2019

90 Who will foot the bill for Germany's air pollution problem, A report shared at the European Union conference in 2015, found at https://www.dw.com/en/german-court-allows-city-ban-on-diesel-cars/a-42753227-0, accessed on 20/07/2019

Chapter Four Conclusions and Recommendations

The overall objective of the research was to investigate why the quality of air seems to be deteriorating in spite the presence of legal, policy and institutional framework to address real and potential air pollution as envisaged at Article 42 and schedule IV of the Constitution. In the context of the bigger picture the study did the following: examined the extent environmental legislation guarantees the right to clean breathable air: Assessed whether the institutional framework promoted clean air in Kenya: and reviewed the responsiveness of the existing preventive and curative mechanism designed to scale down air pollution in Kenya.

4.1 Summary findings of the study

This section summarizes findings following the objectives of the study. Especially, the results reveal how the laws, policies and regulations interface with institutions mandated to deal with air pollution, besides showing how various approaches have been used to reduce concentrates of fine particulate matter (PM 2.5) and PM 10 including emissions from mobile and stationery sources. The findings have been contextualized in the objectives of the study, which are:

a) To examine which environmental legislation in Kenya guarantees the right to clean breathable air.
b) Assess whether the institutional framework is structured to promote clean air in Kenya
c) To review the responsiveness of the existing air pollution control mechanisms in Kenya

4.1.1 Environmental Legislation and the Right to clean breathable air

Findings indicate that there are several laws, policies and regulations within the mandate of relevant environmental institutions are in place for air pollution control. Legal motivation towards air pollution control as found in the Constitution at Articles 10, 42, 43 and 69, as well as EMCA at section 78 which reflects Air Quality Regulations. Further legal commitment to

address air pollution is seen in the county environmental regulations, laws, policies and action plans. Counties such as Nairobi, Mombasa, Turkana and Isiolo not only have county executive committees for environment in place but have enacted air pollution laws and by laws that speak to procedures of facilitating air free from dust infringement and other obnoxious smells caused by open burning of plastics.

There is foundational air pollution control mechanism offered through Air Quality Regulations and section 78 of the EMCA provide the general legal and policy structure by which other laws such CCA, Energy Act and NTSA Act reside. While this looks comprehensive, it provides an implementation challenge that requires good interagency cooperation. It also points to the different range of actions by the various institutions. This present opportunities for duplication of roles between and across institutions. For instance, NTSA has county officials dealing with pollution matters especially from motor bikes and vehicles. At the same time the county governments have executive committees with mandate to address general air pollution. The study revealed that duplicity is likely with this kind of arrangement especially where inter-agency collaboration is poor.

Effectiveness of law and policies in the Kenyan context is concomitant to the awareness levels of the public likely affected by air pollution. Therefore, actualizing the principle of sustainable development and public participation as enumerated at Article 10, 69 and 186, as well as statutory at section 3 (A) of the EMCA. While this is the expectation in law and policy, commentators such as Eunice Omanga,[91] Michael Gitari[92] and Benjamin Barczewski[93] have

[91]Eunice Omanga, Lisa Ulmer, Zekarias Berhane and Michael Gatari, Industrial air pollution in rural Kenya: community awareness, risk perception and associations between risk variables,(2014), BMC-PH
[92]Michael Gitari, Air you breathe in Nairobi may kill you, (Daily Nation, 15 May, 2015) https://www.nation.co.ke/counties/Air-you-breathe-in-Nairobi-may-kill-you--says-research/1107872-2651584-grng29z/index.html> accessed on 29/06/2019
[93]Benjamin Barczewski, How Well Do Environmental Regulations Work in Kenya: A Case Study of the Thika

demonstrated in their studies that this is still far cry among the Kenyan public. In the recent concluded World environment day in Gigiri, Nairobi, the Permanent Secretary in the Ministry of Environment raised red flag on the low knowledge among Kenyans on matters of air pollution control.[94] Amidst his messaging, concerns were raised over lack of information in the public domain, even that held by NEMA, yet Article 35 of the Constitution made this a right.

Nonetheless, the laws currently in use have their flaws. A study by Benjamin Barczewski demonstrate that Environmental Impact Assessment are ineffective due to the procedural blunder where the business proponent procures and pays the assessor. This can be misused, even with oversight from NEMA. Another concern as shared by Muigua Kariuki is screening of projects before EIA is carried out. The ideal should be that EIA become the primary component of the screening rather than option. Environmental sanity is integral to decisions that determine development. [95] Therefore, the study finds that for EIA to remain reliable instruments for safeguarding the air from pollution a review of the process is necessary.

On the overall the researcher thinks that regulations, laws and policies must be accompanied with a support framework that may comprise of relevant technologies, air monitoring equipment, a generally environmentally literate public and availability of information on state of clean air in the country, besides an operational environment devoid of corruption. Therefore, to paraphrase Michael Gitari, the presence of good laws and policies alone may not guarantee this country clean breathable air.[96]

Highway Improvement Project, (University of Nairobi & Center for sustainable development, 2013), http://csud.ei.columbia.edu/files/2013/10/Irandu_reportFinal.pdf, accessed on 13 April 2019

[94] Ministry of environment and forestry, "Kenyans unaware of that air pollution is a serious problem, Quote from PS Sunkuli during the Kenya Annual Air Quality Conference at ICRAF, dated 4th of July 2019, found on http://www.environment.go.ke/?p=3085, accessed on 06/07/2019

[95]Muigua Kariuki, Environmental Impact Assessment (EIA) in Kenya, found at http://kmco.co.ke/wp-content/uploads/2018/08/A-Paper-on-Environmental-impact-assessment.pdf, accessed on 20/07/2019

[96]Ibid, 2

4.1.2 Institutions and Control of Air pollution in Kenya

The study's second objective was to assess whether the institutional framework is structured to promote clean air in Kenya. In this discussion looking at the findings several manifestations do confirm that Kenya has appropriate and enough institutions to control air pollution. Laws, policies and regulations as shared by Barczewski point to effective interagency coordination to reduce opportunities for air pollution. To achieve good linkages for air pollution control requires a number of actions that may include the following: a) collection of emission data and the likely impact onto a centralized information register: b) clear standard operating procedures that reduces duplicity and unnecessary competition: and c) structured consultations between relevant institutions.[97] If this proposed arrangement is measured against the state air pollution being experienced especially in urban centers where emissions from motor vehicles is as high, then a conclusion that we are yet there as a country creeps in.[98]

The counties have been given mandate to deal with air pollution at schedule of the constitution, which then directly links to both outdoor and indoor air pollution. Arguments persist that counties do not have requisite knowledge, resources and professionals able to effectively address the question of air pollution.[99] Although county governments are tasked with development of County Environment Action Plans that plug into the National Environment Action plan, there is no evidence to indicate of proportionate capacity to undertake such environmental assignments.[100]

[97] Stockholm Environmental Institute (SEI), Nairobi locals empowered to tackle air pollution, (April 15th, 2019), found on https://www.sei.org/featured/locals-nairobi-act-air-pollution/, accessed on 18/07/2019
[98]Ibid
[99]ESI Africa, Kenya government demands counties cut indoor air pollution, found on https://www.esi-africa.com/regional-news/east-africa/kenyan-gov-directs-counties-cut-indoor-air-pollution/, accessed on 07/07/2019
[100] Ibid

The common theme from the reviewed aspects of law and institutions mandated to control air pollution is that Institutional governance gains credibility if institutions demonstrate fidelity to policy and regulation which often manifest as non-discriminate monitoring and auditing pointing to effective enforcement.[101] For instance, the law provides for two-year inspection of private vehicles. This has not happened. Focus has been public service vehicles. Nevertheless, smoky soot bellowing cars continue to roam Kenyan roads without any form of punishment.[102] This has not only reduced the import of the adjudicating bodies such as ELC and National Environment Tribunal (NET) but dented the application of polluter-pays principle that is quite fundamental in adjudicating air pollution matters.[103] This finding calls for an improved observation and execution of law and policy.

Institutional incapacity to deliver the function of air pollution control has been cited by several researchers. Samson Mukaria[104] and Benjamin Barczewski[105] studies point to the lack of enough financial muscles for institution like NEMA as well as stretched manpower to undertake assessments, audits and even monitor the state of clean air in the country. This situation as emphasized by Temesgen Gebreyesus, who takes note of the inadequacy of the infrastructure that supports air quality monitoring equipment in the country. This finding indicates two scenarios: the possibility of not having reliable data: and likelihood of not

[101] WHO, Air quality deteriorating in many of world cities, "Despite the upswing in air quality monitoring, many cities in low- and middle-income countries still lack capacity to do so. There is a particular shortage of data in WHO's Africa and Eastern Mediterranean regions." Found on https://www.who.int/mediacentre/news/releases/2014/air-quality/en/, accessed on 09/07/2019

[102]Muntaka Chasant, Air pollution in Kenya: causes, effects and solutions, (March 3, ATCMASK, 2019), found on https://www.atcmask.com/blogs/blog/air-pollution-in-kenya, accessed on 08/07/2019

[103]Angote Oscar, The role of the environment and land courts in enforcing environmental law: A critical analysis of the environmental caseload, (University of Nairobi, 2018)

[104]SamsonMukaria, Analysis and Perception of Health Impact of Motor Vehicle Emissions on Traffic Police in Nairobi, Kenya, (2017), Vol. 5, No. 3, 104-110 JEPHH, found on https://profiles.uonbi.ac.ke/tthenya/files/analysis_and_perception_of_health_impact_of_motor_vehicle_emissions_on_traffic_police_in_nairobi_kenya_journal_of, accessed on 12/07/2019

[105]Ibid, (n, 3)

establishing responsive mitigation.[106] Going forward, the need to match resources and responsibilities if air pollution is to be scaled down.

4.1.3 Responsiveness of approaches for air pollution control

There is no doubt that Kenya has tried several direct and indirect approaches to control air pollution. Green energy technologies, recommendations for improved industrial processes and reduction of motor vehicle use in big cities are among those. Whether these actions have been responsive is in doubt. Indications from various studies by Eunice Omanga and others[107] and Sam Amimo doubt whether the country is ready to facilitate the realization of Article 42 of the Constitution, EMCA and AQR with regard to relevant data to support effective protection or reduction of air pollution. Further, doubts have been expressed to sustain perception that the country does not have cost effective and fair instruments for monitoring air pollution besides assurance to the public that quality air goals are likely met, similarly credible.

In order to provide realistic air management there is need to have in place relevant technologies, mechanisms for following up compliance and be supported by remedial system that creates a balance between people, prosperity and planet. This is not the case for Kenya for the following reasons: first there are offences, though provided for do not reflect the seriousness of air governance. For instance, any person who contravene the regulations is liable to a conviction can be asked to pay half a million in fine or face jail term of less than six months: the second aspect of this provision is the possibility that such a person may be charged a daily penalty of

[106]Temesgen Gebreyesus, Review of EIA in East Africa: Challenges and Opportunities in Ethiopia and Kenya, (2017), Earth Sciences. 6. 44. 10.11648/j.earth.20170604.11.
[107] Eunice Omanga, Lisa Ulmer, Zekaria Berhane and Michael Gatari, Industrial air pollution in rural Kenya: community awareness, risk perception and associations between risk variables, (2014), 14 BMC, 377

10,000 Kenya shillings on each count not complied with to force through compliance. How practicable could this be? Yet the bodies in charge as also overstretched.

Information and its power cannot be gainsaid. From the discussions in the study, access to relevant information at right times is necessary for the members of public to become effective partakers of air pollution control. This is because they need to use reliable information and air quality data accessible in publicly recognized spaces. However, this is almost impossible if looking at the works of John Kakonge indicating that many people resident in the slums of Nairobi mostly depend on their sense of smell to tell if air is polluted.[108] This reduces the effectual application Article 22[109] and 70 (1)[110] of the constitution, which is a departure from locus standi holding to have been the prerogative of the Honorable Attorney General in the *Wangari Mathai vs. Kenya Times Media.*[111]

From the national stage with NEMA in charge to the county level where counties have been given mandate to ensure that air pollution does not occur or is reduced in their jurisdictions, there is absence of reliable information on the state of air. This is because such an assignment requires a clear implementation framework which provides plans on frequent or structured data collection to enable development of air pollution maps and trends, upon analysis. However, many writers including Mulaku Galcano[112] and Michael Gitari have insisted that the country lacks such a framework.[113]

[108]Kakonge John, Environmental Impact Assessments: Why it fails in Kenya, (2018) https://www.pambazuka.org/land-environment/environmental-impact-assessment-why-it-fails-kenya, accessed on 09/07/2019
[109] Constitution, Article 22 (2010)
[110] Ibid, at Article 70 (1)
[111]Maathai v Kenya Times Media Trust Ltd [1989] eKLR
[112]Galcano Mulaku and W. Kariuki, Mapping and analysis of air pollution in Nairobi, Kenya, a presentation at International Conference on Spatial Information for Sustainable Development Nairobi, Kenya (2-5 October, 2001)
[113]Ibid, (n, 17)

The capacity of the country to monitor air pollution is dependent on adequacy and reliability of relevant air quality monitoring tools and equipment. The AQR at section 18 provides for regulation of emissions often initiated and reported by the proponents of businesses and projects. The capacity to get alternative intelligence would be objective in the event that proponents of projects and businesses are subjective in their own assessment. During the World Environment Day, held in China, inadequate monitoring of quality air was cited as the single most obstacle reducing capacity of rapidly developing cities in the third world to control air pollution.[114] Similar sentiments were expressed by Dr. John Mumbo in the Nairobi celebrations, who then placed emphasis on the need to have all actors, especially industries do their bit of acquiring relevant technology, diversifying energy sources and providing reliable data, more so be willing to observe all precaution and prevention principles to propagate clean and quality air.[115]

With an emphasis of studies by Benjamin Sitati,[116] Hellen Simiyu[117] and Priyanka de Souza, it is clear that the country's policy makers and implementers struggle to find compromise of development and air pollution control. The study affirms that sustainable development guides hybrid human development approach to reduce dangers caused by air pollution even as job opportunities are created. An example that evidences this concern is found in the allegations

[114]UNEP, World Environment Day, China, 5th June 2019, found on https://www.unenvironment.org/events/un-environment-event/world-environment-day-2019, accessed on 09/07/2019

[115] NEMA, World Environment Day, Kenya, 5th June 2019, found https://www.nema.go.ke/index.php?option=com_content&view=article&id=286:kenya-commits-to-address-air-pollution&catid=10:news-and-events&Itemid=441, accessed on 09/07/2019

[116]Sitati Benjamin, Management of industrial air pollution in industrial area of the Nairobi County, (Kenyatta University, 2014)

[117]Helen Simiyu, Environmental quality, trade openness and economic growth: An implication of the environmental Kuznets curve, (University of Nairobi, 2015).

that Kenya has not migrated to high fuel-efficient technologies for the fear to scale down investments that currently afford many Kenyans sources of livelihood.[118]

The difficulty to have a comprehensive-all-inclusive air pollution control mechanism is evident. This situation is prevalent in the public transport sector, where inspection of private cars, public service vehicles and "bodaboda" remain a challenge. While the many statutory provisions are meaningful, inclusive inspection, monitoring and audit is a far cry. For example the provision that only cars less eight years old can be imported into the country does portend to have air that is less polluted going forward but it does not indicate how to position inspection of public service motor bikes whose numbers have risen threefold.[119] Inspection of motorbikes used in public transport are not open for inspection as public service vehicles.[120] Secondly, there is no guarantee that inspection of motor vehicles will not suffer from imprudent decisions[121] and likely blatant abuse of processes, especially in the eyes of corruption.[122] There are many vehicles belching smoke on the Kenyan roads yet the regulations at 26 (1-3).[123] The study is concerned by this because the country experiences 26% of cars increase on the roads.[124]

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[118]The World Bank, Reviving Lake Victoria by Restoring Livelihoods, found at https://www.worldbank.org/en/news/feature/2016/02/29/reviving-lake-victoria-by-restoring-livelihoods, accessed on 13/09/2019

[119] Real time air pollution monitoring launched in Kenya (1st September, 2015)"The Executive Director of UNEP Achim Steiner observed that the proliferation of motor-bikes was a big boost to the Kenya economy but lamented that the machines were the single largest cause of air pollution in the country. He advised Kenyans to adopt the electric powered motor-bikes to reduce the level of air pollution", found on http://www.environment.go.ke/?p=1358, accessed on 09/07/2019

[120] Daily Nation, Reform transport, our health is at risk, 19th June, 2019, found on https://www.nation.co.ke/oped/opinion/Reform-transport--our-health-is-at-stake/440808-5146470-tuuxcgz/index.html, accessed on 07/07/2019

[121] Kenya News Agency, Proposed inspection regulations will promote corruption, found on http://www.kenyanews.go.ke/proposed-inspection-regulations-will-promote-corruption/, accessed on 07/07/2019

[122] General motors, Production of cleaner vehicles in Kenya, a presentation made for Isuzu trucks, found on https://wedocs.unep.org/bitstream/handle/20.500.11822/25233/ProductionCleanerVehicles.pdf?sequence=7&isAllowed=y, accessed on 07/07/2019

[123]Ibid, 126

[124]State to set up vehicle disposal center in proposed law, found on https://www.the-star.co.ke/business/2019-05-21-state-to-set-up-vehicle-disposal-centres-in-proposed-law/, accessed on 20/07/2019

Findings in this study denote that most interventions save for those provides in AQR and EMCA do not focus on defeating air pollution. Air pollution manifests as a secondary benefit. Several actions demonstrate this: the non-motorized interventions assume the safety of road users and not air pollution. Proposed inspection of motor vehicles is predetermined by the ability of the country to reduce road accidents.[125] Decongestion of cities and other urban centers are keener on the strategic use of the land such as beautification, relocation of businesses and easing of movement rather than reducing air pollution.[126] This takes away the essential aspects of planning to include interventions specific to air pollution.

Reviewed works focusing on nonstate actions seem to suffer from inconsistent state support. This points to unsustainable trends which then discourage proliferation of well-meaning interventions. In this context the presence of the GESIP may guarantee the adoption and multiplication of the use efficient cook stoves, campaigns to transit to solar lighting and energy including heating. The absence of deliberate state participation reduces the sustainability of such initiatives because most are donor funded with defined time frames and thematic focus. The study finds relevance in a structured state and nonstate actors' partnerships towards air pollution control.

The research established the less use of forums available to deal with air pollution. This is informed by many factors, among them absence of appropriate information.[127] This has lessened the use of ELC courts and petitioning of decisions made by National Environmental

[125] State to set up vehicle disposal center in proposed law, found on https://www.the-star.co.ke/business/2019-05-21-state-to-set-up-vehicle-disposal-centres-in-proposed-law/, accessed on 20/07/2019

[126] University of Nairobi, An Article on UON researchers to undertake air quality monitoring in Nairobi, a quote from Prof. Kiros Berhane, "In addition, we seek to undertake a study on occupational impacts of climate change in flower farms," added Prof. Kiros Berhane from the University of Southern California. "Interestingly, there is little or no studies conducted on the impact of air pollution and health on mortality and mobility on the population of Nairobi, found onhttps://www.uonbi.ac.ke/index.php?q=content/uon-researchers-undertake-air-quality-monitoring-nairobi, accessed on 20/07/2019

[127]Ibid, (n, 13)

Tribunal (NET).[128] Further, the study found slow growth of jurisprudence on matters of air pollution due to limited use of the ELC and NET. As earlier on established by Maurice Odhiambo in 2003[129] and emphasized in 2018 by Oscar Angote,[130] the absence of air pollution matters in the court reduces capacity of judicial officers to integrate environmental principles in their decisions. The impact is less interest from members of the public on ELC as preferable forum to solve air pollution matters. There is urgency that information of such platforms be made public and members of the public encouraged to exploit them to safeguard the air from pollution.

4.2 Overall Conclusion

The generosity and appropriateness of the legal, policy and institutional scheme has been canvassed and confirmed to control air pollution. Nonetheless, the research asserts that the legal, policy and regulatory infrastructure is affected by inbuilt inconsistencies such as: duplication of roles and competition over geographical jurisdictions: allegations of thinned integrity on matters of EIAs originating from the investor paying for the assessment with unequal counter-assessment reports: second, the study revealed the existence of institutions mandated to protect air from pollution. These institutions have strengths that can be utilized for the benefit of clean air. Among the strengths is clear thematic mandate: clear coordination role played by NEMA: the provision for inter-agency collaboration. Nevertheless, a number of weaknesses derail the operations to guard air from pollution. This includes inadequate financial and technical capacities to deliver their mandate: poor sharing of information: non-obligatory mechanism to foster information sharing: inadequate involvement of the larger civil society in decision making. Lastly, upon examination of preventive and curative measures there is

[128]Ibid, (n, 13) chapter 3
[129]Odhiambo Maurice, The role of courts in environmental management: A case of Kenya, (University of Nairobi, 2003)
[130]Ibid, (n, 13)

consensus that the multiplicity of interventions has not dealt with air pollution conclusively. Therefore, more coordinated approach is required supported by enough budget provisions of the national and county budgets.

4.3 Recommendations from the Study

4.3 .1 Short term recommendations

a) Issue sensitization and awareness program

The country, through consultation between Council of Governors and the National Government designs county-based awareness and issue sensitization project to help public appreciate deadly effect of spiraled air pollution. This should speak to the synergy necessary to propel air pollution agenda but also offer mentorship programs between national and county governments.

b) Strengthen mechanism of data collection as regards air pollution

The study has indicated that a number of initiatives exist to collect data and information of state of air mostly in urbanized areas of Nairobi, Mombasa and Kisumu. In this context a proposal to strengthen such initiatives by maintaining the current equipment and technology stations so that collection of data and information infrastructure regarding state of air pollution is consistent. This should lead to county air pollution register by the support of air pollution maps. Eventually develop a centralized state of air register-to inform the Air Quality Index.

c) Review operational mandates of institutions tasked to deal with air pollution

Review the operational mandates of the different institutions with a view to remove duplicity and unnecessary competition. This can be remedied by the establishment of a clean air management working group (CAM-WG) consisting of state and nonstate actors, especially the NEMA, Climate Change Council, Council of Governors, the proposed National Automotive Council, National Police Service amongst others) to act as a reference point towards a

structured air clean air audits and monitoring. This should be able to midwife the inter-agency consultations on sharing of information, calendars of EIAs and monitoring and audit reports Integrate

d) Advocate for increased uptake of alternative cooking, lighting and heating sources

Going through the approaches used to deal with air pollution, the study denoted of the poor uptake and proliferation of alternative sources like solar, biogas, Liquefied Petroleum Gas (LPG) and electricity. In this context lobby that the defunct Gas Ya Mwananchi project (This was a project managed by National Oil of Kenya (NOCK) is revived to escalate access less-emitting sources of cooking. This will essentially reduce the over reliance on wood fuel and kerosene. The benefit of this is threefold: reduced pressure on forest cover: reduced health complications emanating from emissions from biomass: and improved uptake of related services such as education.

e) Integrate non-categorized inspection units into the annual inspection of PSVs

Emissions in both rural and urban centers has increased due to the presence of boda-bodas, that have become one of the most relied upon means of transport in terrains that mainstream PSVs does not reach. In the short term as the country prepares for undertaking long term emission reduction strategies, boda-bodas must be enjoined into the inspection system, even if it is through their solidarity groups.

f) Remedial measures campaigns

There are several avenues through which air pollution matters can be dealt with. There are administrative, incentive and court driven approaches. However, there is consensus that some of these avenues are least used, which can be attributed to a number of reasons. The study suggests a deliberate campaign to popularize the employment of the various avenues which include making use of the Environment and Land Court.

4.3.2 Long term recommendations

a) National public education and awareness program

The study confirmed that public participation is a major problem, partly because many of the people affected lack insight of what leads, constitutes and results into air pollution, the effects notwithstanding. Therefore, a long-term plan is required to ensure that members of the public begin receiving knowledge and information on air pollution within a bigger environmental management program. This learning will improve the information portfolio in the public space as regards air pollution, raise awareness and improve decision making, importantly influence uptake and integration of alternative cooking and heating fuels away from biomass and other pollution favourable sources of lighting.

b) Create a framework for alternative domestic fuels and technologies for lighting

There have been complains indicating the higher and unmanageable costs of accessing alternative fuels and heating agents at the household level. This is coupled with lack of a clear guideline or program to ensure that low cost alternative fuels are available, including substitute sources of lighting to reduce on the use of kerosene especially in the rural areas. Such a framework would go a long way in the planning, budgeting and proliferation of alternatives to biomass and lighting agents full of emissions.

c) Incentification of cheap clean air technology and equipment

The study realized that the cost of acquisition for the relevant technology and equipment that measure, monitor and aid in the auditing of air pollution is not cheap. Therefore, a framework run by the central government on subsidized costs, or reduce/remove taxes on all the equipment and technologies necessary to deal with air pollution. This is particularly important if air monitoring, auditing and evaluation is to be mainstreamed into decision making.

d) Motor traffic technology transition program

There is acknowledgement of extreme emissions from fuel inefficient motor vehicles and this should be addressed. Since it has taken almost a century to acquire and continue to use petroleum propelled motor vehicles, there is a need to draw a Motor Traffic Technology Transition Program (MTTTP), in which as a country we can commence the replacement of petrol and diesel driven cars into Hybrid electric technologies. This will not only reduce air pollution but similarly improve the general set up of the energy sector in Kenya.

e) Country wide air pollution strategy

This research recommends through the proposed working group that there be established Kenya Air Pollution Management Strategy. Given this strategy the inter-agency approach will be institutionalized to deal with the deteriorating standards of clean air, especially lobbying for direct, responsive budget lines for air pollution. For instance, such a strategy may lead to recommendations of appropriate budget lines, that may discourage reduction of budgetary allocations, which from records have been decreasing. In 2017/2018 and 2019/2020 the budgetary allocation reduced by about 11%. This proposal does not negate the place of NEMA and its plans even within the ambit of National Environment policy including the coordination role, but studies have demonstrated that its coordination role is hampered by a number of factors.

f) Codification of the laws on air pollution into a single statute

The researcher recommends that air pollution laws be set up in one statute to help harmonize the different approaches used by the many institution whose roles are also diverse. Although there are provisions in AQR and EMCA, the study is privy to other attendant laws and policies such as Climate Change Act, Energy and Petroleum Act, NTSA and Traffic Act amongst others. This is besides the county-based legislations. In order to avoid any doubt and improve

operational efficiency and standards, the desire to codify is justified. A proposal for a clean air act is given by this study. The researcher thinks that this will the basis upon which an air pollution management strategy would be anchored and subsequent budgets or planning.

g) Strengthening of NEMA as the oversight institution on air pollution

The study reveals a lot that seem to be lacking within and outside NEMA as regards management of air pollution. Some of the issues include poor financing, inadequate technical capacity, over reliance on self-regulation and incapacity to monitor state of air pollution in the country. However, there is an opportunity to enhance the capacity of NEMA to improve service delivery, partly by building capacity of the institution to undertake EIAs and also have equipment and technologies for clean air quality. If need be, establish an air pollution specific institution that undertakes training for officers in different sectors charged with watching over air pollution sources.

4.4 Areas of Further research

a) Understanding inter-county relationships on air pollution

Air pollution in this country, even as schedule IV is actualized through the many laws, policies and regulations being put in place by county governments has a transboundary nature. This requires a number of things, including a responsive law and dispute handling considering air to be a shared resource

b) Impact of air data information on community perspectives

In this research it was established absence of data and information on air pollution seems to have an impact. It was not in the purview of this study to interrogate this assertion, in order to find out if this would have had any impact on the management of air pollution. It is therefore recommended that further research be carried out on this question.

c) The impact of resurgent campaign of NEMA as custodian of clean air in Kenya

This study pointed to the lack of trust by public on the capacity of NEMA to remain the custodian of air pollution processes. Following the limitation, it is hereby recommended that further research be undertaken to ascertain what would be the impact of a campaign where NEMA speaks to public as a reliable protector and promoter of clean air in Kenya.

d) Significance of an air pollution specific institution

The study shyly suggests the need to establish an air pollution specific institution run by the state, separate from NEMA. However, due to limited scope, the researcher proposes further research on what this would mean in management of clean air, focusing on the role of such an institution in light of the existing ones.

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