REPORT ON THE BEST PRACTICES FOR REGULATING AIR QUALITY GLOBALLY

IN-DEPTH RESEARCH

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REPORT ON THE BEST PRACTICES FOR REGULATING AIR QUALITY GLOBALLY: AN IN-DEPTH RESEARCH.

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Disclaimer

This assignment aimed to conduct in-depth research on best practices for regulating air quality globally. The findings from this research will be used to draft clear, enforceable quality regulations specific to the Nairobi City context. Therefore, the report only reflects the views of the author(s) and not the views of other participants in the Breath Nairobi Project.

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EXECUTIVE SUMMARY

This report presents a comprehensive review of global best practices in air quality regulation, tailored to Nairobi's urban context. Funded by the Clean Air Fund through the Breathe Cities Initiative, the report examines the legal and policy frameworks that cities worldwide employ to mitigate pollution, with insights from London, Accra, Johannesburg, Kampala, and Addis Ababa. Key findings highlight that multi-stakeholder collaboration, enforceable policies, and robust data monitoring systems are essential for achieving sustainable air quality improvements.

In Nairobi, local regulations have advanced through the Nairobi City County Air Quality Action Plan (2019–2023) and the upcoming Nairobi City County Air Quality Bill (2021). However, gaps remain in enforcement mechanisms, community engagement, and technological resources, challenging Nairobi's regulatory effectiveness. Notable successes in similar African cities, like Accra and Johannesburg, underscore the importance of integrated policy strategies and partnerships with stakeholders to amplify public awareness and promote clean air technologies.

Best practices identified include the adoption of stringent emission standards, community-centric policy formulation, and investment in low-cost air quality sensors. Challenges persist due to resource limitations and competing priorities, such as economic growth versus environmental health. The report concludes that Nairobi's regulatory framework could benefit from strengthened cross-sector collaboration, customized policy models, and continuous public engagement. These measures are vital to sustaining clean air initiatives and safeguarding urban health as Nairobi continues to grow.

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CHAPTER 1

INTRODUCTION

1.1 The Clean Air Fund

The Clean Air Fund is a philanthropic organization established to combat air pollution globally. Founded in 2019, it catalyzes funding, advocacy, and action for cleaner air. It works with governments, campaigners, researchers, funders and businesses to create a world where everyone breathes clean air. Clean Air Fund accelerates the clean air movement by funding and partnering with organizations across the globe that promote data, build public demand for clean air and drive action. It also engages and supports decision-makers to act on clean air by bringing together funders, researchers, policymakers, and businesses in campaigning to strengthen the air quality cause.

The Clean Air Fund's strategy focuses on reducing air pollution by investing in evidence-based solutions, advocating for stronger policies, and raising public awareness. It collaborates with governments, businesses, and civil society to implement cleaner technologies, promote regulatory reforms, and drive behavior change. Prioritizing low- and middle-income regions, the fund works to protect vulnerable populations and emphasizes the health and climate benefits of improving air quality. Their approach integrates data collection, public-private partnerships, and consistent impact tracking to ensure sustainable, long-term improvements in global air quality.

1.2 The Breathe Cities Initiative

The Breathe Cities Initiative is an initiative delivered by Clean Air Fund, C40 Cities and Bloomberg Philanthropies which focuses on building coalitions of cities committed to implementing innovative air quality policies and interventions. The Breathe Cities Initiative provides support across four pillars to enable the successful implementation of ambitious new policies for urban air quality, improve public health and accelerate decarbonization to create sustainable cities. The pillars are as below;

- Data and Research

- Stakeholder and Community Engagement
- Technical Policy Assistance
- Lesson Sharing

The Breathe Cities Initiative embraces a collaborative approach by funding a range of local partners, including campaigners, community groups, academic institutions and Non-Governmental Organizations working in close collaboration with participating city governments.

1.3 About ECAS Institute

ECAS Institute is one of the grantees working on the Breathe Nairobi Initiative, working on a project titled "Development and Enactment of Nairobi City County Air Quality Regulations". This project aims to develop air quality regulations for Nairobi City County, allowing them to enforce existing air quality laws and policies. These regulations will be based on relevant Nairobi City County laws like the Air Quality Act of 2022[1], Transport Act of 2020[2], Solid Waste Management Act of 2015[3], national standards and existing national regulations for sectors like transportation, waste management, and industry. To ensure effective application, the project will also include training for those responsible for implementing and enforcing the new regulations.

1.4 The Objectives of the In-Depth Research

The main objective was to conduct in-depth research on best practices for regulating air quality globally. The research findings will be used to draft clear, enforceable air quality regulations specific to Nairobi's context.

[1] https://nairobi.go.ke/wp-content/uploads/Air-QualityAct.pdf
[2]https://nairobiassembly.go.ke/ncca/wp-content/uploads/act/2021/Nairobi-City-County-Transport-Act-2020.pdf
[3]https://nairobiassembly.go.ke/ncca/wp-content/uploads/act/2023/Nairobi-City-County-Solid-Waste-Management-Act-2015-2.pdf

1.5 Methodology

For this research, the guiding methodology is secondary data collection. The key sources of the data under review are online scientific journals, research, peer-reviewed articles, and government and private-sector publications.

CHAPTER 2

REVIEW OF AIR QUALITY REGULATIONS: GLOBAL, REGIONAL AND LOCAL

2.1 Introduction

Air quality is a significant global public health concern. It affects human health, biodiversity, climate change, and ecological balance. With the growth of industrial activities, urbanization, and transportation systems globally, air pollution has reached critical levels. This has resulted in increased rates of respiratory diseases, cardiovascular illnesses, and premature deaths, particularly in urban areas.

This has led to various international regulatory frameworks emerging to curb air pollution in response to these concerns. The objective of the air quality regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. International organizations, such as the World Health Organization (WHO) and the United Nations Environment Programme (UNEP), have established guidelines and policies to combat air pollution. This report explores the evolution of air quality regulations on the global stage, the contributions of international organizations to these regulations, and the impacts of key initiatives such as the Breathe Cities Initiative. Through detailed case studies of cities adopting these frameworks, this report will assess the effectiveness of these initiatives and analyze statistical variations in air quality before and after implementing air quality regulations. This review examines air quality regulations from a global perspective, regional initiatives, and local policies in Kenya, providing a comparative analysis of enforcement mechanisms and challenges.

2.2 Global Air Quality Regulations

Several global organizations play a key role in setting air quality standards and promoting clean air. The International air quality regulations vary significantly and this is because the regional priorities, pollution sources, and levels of enforcement are different across the divide.

Globally, the World Health Organization (WHO) plays a central role in setting air quality guidelines, which are used as reference points for national regulations. In 2021, WHO updated its Air Quality Guidelines (AQGs), recommending stricter thresholds for key pollutants such as particulate matter (PM) and nitrogen dioxide (NO_2) due to increasing evidence of their impacts on health. These guidelines serve as non-binding recommendations for countries to adopt into national legislation, and they emphasize the urgent need to address air pollution's role in noncommunicable diseases like cardiovascular and respiratory conditions.

In the United States, there has been a long history of legislation on air protection. The passing of the first act concerning air quality in the U.S. was prompted by an event in 1948. In that year, a cloud of pollutants (smog) hung over the industrial town of Donora in Pennsylvania for 5 days. That smog killed 20 people, and disease symptoms manifested themselves in more than 6 thousand others (Orford, 2021)[4]. In 1955, the U.S. Congress adopted federal air pollution legislation: the Air Pollution Control Act which identified air pollution as a national problem.

This legislation also envisaged funding for air pollution research. The upshot was the first Clean Air Act (CAA) eight years later (1963). The primary task of the CAA was to educate and to carry out studies to clean up polluted air. There was no mention, however, of any intention to reduce the level of pollutants in the air. In 1965, the CAA was amended by the Motor Vehicle Air Pollution Control Act, which laid down emission standards for light-duty motor vehicles (Kubiszewski, 2008).

Two years later, the Air Quality Act (AQA) of 1967[5] was established. This Act required that states be responsible for establishing regional air quality standards based on federal air quality criteria and comprehensive plans for implementing these air quality standards according to the timetable. However, this law was not effective, therefore, Congress recommended new legislation. In 1970, the Congress passed a new Clean Air Act. This Act set standards for six pollutants – sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, particulate matter and lead. In addition, the act laid down requirements regarding the implementation of air quality

[4] https://heinonline.org/HOL/LandingPage?handle=hein.journals/haswnw27&div=14&id=&page=
[5] https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act#:~:text=As%20part%20of%20these%20proceedings,monitoring%20techniques%2C%20and%20control%20techniques.

programs and substantially expanded the enforcement of motor vehicle emission limits. In the same year, Congress established the Environmental Protection Agency (EPA), whose task was to oversee the implementation of the standards set out in the Clean Air Act of 1970.

Since many states failed to meet mandatory air quality standards, amendments were subsequently introduced to the CAA. In 1977, the regulations regarding the Prevention of Significant Deterioration (PSD) of air quality in areas attaining National Ambient Air Quality Standards (NAAQS) were altered to include requirements for areas not fulfilling the NAAQS (CAA, 2011). Further major amendments were made to the CAA in 1990: the new regulations rectified and expanded the act. The idea of emissions trading was escalated, and the EPA was granted greater powers concerning the implementation and enforcement of the rules aimed at reducing pollutant emissions to the air. Further changes were made to the act with the aim of (EC, 2004):

- Reducing the use of ozone-depleting substances;
- Reducing emissions of substances causing acid deposition;
- Limiting emissions of air pollutants from specific sources;
- Limiting the sources of exposure to Hazardous Air Pollutants;
- Protecting and improving visibility in national parks and wilderness areas;
- Introducing more rigorous norms for motor vehicle pollutant emissions;

The Clean Air Act sets up air quality standards in the United States. Being a federal act, it applies throughout the country. Nonetheless, each state must write its own State Implementation Plan (SIP), containing information on how to monitor air pollution in that state. If the plan for reducing air pollution complies with the EPA's requirements, it is approved; if not, the EPA may impose sanctions on the state in question.

Motor vehicles are one of the main sources of urban air pollution. Therefore, the U.S. has also introduced standards for the emission of pollutants from motor vehicles. There are two standards for vehicle emissions. One emission standard was established by the Environmental Protection Agency (EPA) and the second, more stringent, by the California Air Resources Board (CARB). Other states may choose to follow either the Federal standard or the California standards.

In Europe, the leader of air quality management systems implementation was the United Kingdom, which in 1906 introduced the Alkali Works Regulations Act. Some years later, air protection came to be seen not just as a local, regional or national problem, but as a supernational (creation of the EU). EU law has been regulating air quality management for the last 30 years and it embraces some 300 legal instruments, such as directives, orders, decisions and recommendations. The oldest piece of legislation in the field of air protection, developed within the European Union, is the Convention on Long-range Transboundary Air Pollution. It was signed in Geneva in 1979. The Long-range Transboundary Air Pollution (LRTAP Convention[6]) and its subsequent protocols concern the limitation of emissions of the following groups of pollutants: sulfur compounds (SO_2), nitrogen oxides (NO_x), ammonia (NH_3), volatile organic compounds (VOCs), heavy metals (Cd, Pb, Hg), persistent organic pollutants (POPs) and particulate matter (PM_{10}, $PM_{2.5}$). It primarily focused on the pollutants that cause acidification, eutrophication and the occurrence of ground-level ozone. The directive regarding the limitation of SO_2 levels and the number of suspended particles in the air came into force in 1980 (Directive 80/779/EEC, 1980[7]). Subsequent years saw the issue of directives stipulating permissible levels of lead (Directive 82/884/EEC, 1982[8]) and nitrogen dioxide (Directive 85/203/EEC, 1985[9]) in the air.

Regulations on emissions of industrial pollutants into the atmosphere were also introduced (Directive 84/360/EEC, 1984; Directive 88/609/EEC, 1988[10]). The implementation of the recommendations in these directives led to a reduction in SO_2 and NO_X emissions into the air. But to achieve more tangible effects, it was decided to introduce more stringent requirements. In 1996 the EU passed the Directive on Ambient Air Quality Assessment and Management (Directive 96/62/EC, 1996[11]). This set out new requirements regarding air quality, and the action taken aimed at preventing or limiting harmful effects on human health and the environment. It also contained recommendations regarding air quality assessment methods and criteria, common to

[6] https://unece.org/sites/default/files/2021-05/1979%20CLRTAP.e.pdf
[7] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A31980L0779
[8] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A31982L0884
[9] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31985L0203
[10] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A31988L0609
[11] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A31996L0062

all member states. This directive failed, however, to establish permissible levels for particular chemical compounds.

Given this, a few years later the EU passed 4 daughter directives, with more exacting requirements regarding particular compounds. The first Daughter Directive (Directive 1999/30/EC, 1999[12]) on permissible levels of SO_2, NO_2, NO, dust and lead was passed in 1999. The second Daughter Directive (Directive 2000/69/EC, 2000[13]) passed in 2000, laid down acceptable levels of CO and benzene. The third Daughter Directive of 2002 (Directive 2002/3/EC, 2002[14]) related to ozone in ambient air, and the fourth Daughter Directive (Directive 2004/107/EC, 2004[15]) established permissible levels of arsenic, cadmium, nickel and PAHs in ambient air.

These directives stipulated the permissible levels or the levels to be achieved by a specified deadline. The EU has also introduced norms for the emission of pollutants from stationary and mobile sources (motor vehicles). The former is referred to in Directive 2001/80/EC (Directive 2001/80/EC, 2001[16]), passed in 2001. This lays down very precisely the permissible levels of pollutant emissions from large coal-fired power generating plants. The aim is to gradually reduce annual emissions of SO_2 and NO_x from existing installations and also to specify permissible emissions of SO_2, NO_x and specks of dust from existing and new incinerators.

The European Union air quality framework is governed by the Ambient Air Quality Directives and it is currently revising these directives to align more closely with The World Health Organization's updated standards. Recent assessments indicate that stricter limits on pollutants such as Particulate Matter (PM) and tropospheric ozone will likely be adopted. The revision process includes consultations and studies that evaluate the effectiveness of current monitoring and mitigation measures.

[12] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31999L0030
[13] https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32000L0069
[14] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32002L0003
[15] https://eur-lex.europa.eu/eli/dir/2004/107/oj
[16] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32001L0080

The United Nations Environment Programme (UNEP) actively promotes clean air initiatives globally, especially in developing countries. UNEP's Clean Air Initiatives help countries reduce air pollution through the implementation of science-based policies. It offers capacity-building programs, technical support, and resources for air quality monitoring. In its global assessment, UNEP emphasizes the need for urgent action to mitigate the health impacts of poor air quality, which causes millions of premature deaths annually.

International treaties such as the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) and the Gothenburg Protocol (under the Convention on Long-Range Transboundary Air Pollution) focus on reducing greenhouse gas emissions and air pollutants. The Gothenburg Protocol, adopted in 1999 and amended in 2012, specifically targets sulfur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs), and ammonia (NH3), to minimize long-range air pollution that crosses national borders. These treaties have played a crucial role in curbing emissions at an international level.

Despite efforts in many regions, air quality standards and enforcement vary widely, with many low- and middle-income countries still struggling to meet even less stringent guidelines. The **State of Global Air 2024**[17] report highlights that pollution remains a significant global health risk, especially in developing regions, where enforcement and monitoring systems are often underdeveloped.

2.3 Regional Air Quality Regulation: Africa

Regional air quality regulations in Africa are increasingly recognized as critical for addressing the continent's significant pollution challenges, especially in urban areas. Several key frameworks and initiatives illustrate the efforts made across various regions:

2.3.1 African Union Initiatives

The African Union (AU) has taken steps to promote air quality management across member states through initiatives like the **African Union Agenda 2063**[18], which aims for sustainable development and improved environmental management. The AU also emphasizes the need for

[17] https://www.stateofglobalair.org/resources/report/state-global-air-report-2024
[18] https://au.int/Agenda2063/popular_version

member states to adopt policies that align with the **Paris Agreement**[19], which includes commitments to reduce greenhouse gas emissions and improve air quality.

2.3.2 Regional Frameworks

Various regional frameworks have emerged, such as the **Southern African Development Community (SADC) Protocol on Environmental Management for Sustainable Development**[20], which includes provisions for monitoring and managing air quality. This protocol encourages member states to develop national air quality standards and regulatory frameworks that address transboundary air pollution.

The EAC's Protocol on Environment and Natural Resources Management, adopted in 2006, emphasizes the need for member states to develop air quality standards to reduce industrial emissions and vehicle exhausts. However, enforcement varies by country, with some nations, like Kenya and South Africa, taking the lead in setting up monitoring frameworks, while others face challenges in implementing effective air quality laws. Among such laws is the EAS 1047:2022. The EAS 1047:2022 standard, adopted by the East African Community (EAC), sets vehicular exhaust emission limits equivalent to Euro 4 standards. These regulations target pollutants such as nitrogen oxides (NOx), particulate matter (PM), and hydrocarbons, with specific thresholds tailored to various vehicle types, including passenger cars, light commercial vehicles, and heavy-duty vehicles. This initiative was implemented across EAC nations to combat urban air pollution and enhance public health by mandating pre-verification of vehicle emissions standards before importation (UNEP, 2022; RSB, 2022).

Recent studies emphasize that while the EAS 1047:2022 standards represent a significant advancement, further progress could be achieved by transitioning to Euro 6 standards. These stricter limits have demonstrated substantial reductions in NOx and PM emissions, particularly under real-world driving conditions, which is crucial for sustaining long-term air quality improvements in urban settings (TÜV Rheinland, 2023; RSB, 2022)

[19] https://unfccc.int/process-and-meetings/the-paris-agreement
[20] https://pmg.org.za/files/180220Protocol_0.pdf

2.3.3 National Initiatives

Countries like **South Africa** have established comprehensive air quality regulations under the **National Environmental Management: Air Quality Act[21] (2004)**. This act empowers local authorities to set air quality standards and implement air quality management plans, focusing on major pollutants like sulfur dioxide (SO_2) and particulate matter (PM).

In **Kenya**, the **National Environmental Management Authority (NEMA)** has developed air quality regulations that focus on emissions from industries and vehicles, with a particular emphasis on monitoring and enforcement to improve urban air quality. Similarly, **Ghana** has been formulating national air quality standards, significantly informed by WHO guidelines and local health data.

1. Air Quality Monitoring Networks

Regional collaborations have led to the establishment of air quality monitoring networks, such as the **African Air Quality Initiative**, which aims to improve data collection and dissemination. This initiative supports countries in developing real-time air quality monitoring systems and enhancing public awareness of air quality issues. For example, the **AirQo project** in Uganda has deployed low-cost air quality sensors to provide real-time data and inform policy decisions

2. Community Engagement and Awareness

In many African countries, there is a growing recognition of the need to engage communities in air quality management. Public campaigns aimed at raising awareness about air pollution sources and health impacts are essential for fostering community support for regulatory measures. Initiatives, like tree planting and promoting cleaner fuels, are often included in these campaigns to encourage public participation in improving local air quality.

Despite these efforts, challenges remain, such as limited resources, lack of comprehensive data, and inadequate enforcement mechanisms. However, the commitment to regional air quality regulations is growing, driven by the urgent need to protect public health and the environment

[21] https://www.dffe.gov.za/sites/default/files/legislations/nema_amendment_act39.pdf

across Africa. Collaborative efforts at regional and national levels are essential to address air quality issues effectively, particularly in rapidly urbanizing areas.

2.4 National Air Quality Regulations: Kenya

Kenya has made notable progress in addressing air quality issues through a series of laws and regulations. The Environmental Management and Coordination Act (EMCA) of 1999 serves as the backbone of Kenya's environmental legislation. Under this act, the National Environment Management Authority (NEMA) was established to oversee environmental protection, including air quality management.

In 2014, Kenya adopted the Air Quality Regulations, which set specific emission limits for pollutants such as particulate matter, nitrogen oxides, sulfur oxides, and volatile organic compounds (VOCs) from both stationary and mobile sources. The regulations target emissions from industries, vehicles, and power plants, requiring them to comply with the specified thresholds. For instance, emissions of particulate matter from industrial sources are capped at 50 mg/m^3, and vehicle exhaust emissions are limited to specific values for carbon monoxide and nitrogen oxides.

In 2022, Kenya came up with Draft Air Quality Regulations for 2022[22] which builds up on the Air Quality Regulations 2014[23]. The main focus of this regulation is on setting standards for ambient air quality, limiting emissions from various sources and enhancing enforcement mechanisms.

2.4.1 The Role of The National Environment Management Authority (NEMA)

The National Environment Management Authority was established as the principal instrument of government charged with the implementation of all policies relating to the environment, and to exercise general supervision and coordination over all matters relating to the environment. In consultation with the lead agencies, NEMA is empowered to develop regulations, prescribe

[22] https://www.nema.go.ke/images/Docs/Regulations/Draft%20Air%20Quality_Regulations%202022.pdf
[23] https://www.nema.go.ke/images/Docs/Regulations/air%20quality%20regulations2014-1.pdf

measures and standards and, issue guidelines for the management and conservation of natural resources and the environment.

The National Environment Management Authority formulated the Air Quality Regulations 2014 which seek to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The Air Quality Regulations are anchored in Section 78 of the Environmental Management and Coordination Act[24] (EMCA) and came into effect through Legal Notice 34 of 2014. The Regulation's objective is to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air.

The regulation also seeks to ensure that there is establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999. Despite the existence of these Regulations, there has been massive pollution of air, especially around major towns due to industrial development and unsustainable modes of transport, mainly public service vehicles (matatus) and other unroadworthy vehicles.

To make its air quality regulations more effective, NEMA has been at the forefront of developing air quality action plans. This is particularly necessary for urban areas like Nairobi, which faces significant pollution challenges from transportation and industrial activities. These action plans focus on reducing emissions through targeted interventions, such as promoting cleaner transport technologies, reducing industrial emissions, and improving waste management systems. By tailoring action plans to the specific needs of different regions, NEMA helps ensure that air quality improvements can be sustained over the long term.

Even with the regulation and the action plan in place, Kenya however still has limited air quality management systems due to inadequate legislation and lack of political will, among other challenges. In addition, maintaining a balance between economic development and a sustainable environment is usually a challenge; there are no investments in pollution prevention technologies. More attention goes to the short-term benefits of increased production and job creation where the lack of air quality management capability translates into a lack of air pollution

[24] https://www.nema.go.ke/images/Docs/Legislation%20and%20Policies/EMCA%20Act%202015.pdf

data, hence the false belief that there is no problem. Under EMCA, projects and activities that are likely to cause air pollution are also to be subjected to an Environmental Impact Assessment and an annual Environmental Audit to confirm compliance with the conditions of the license.

2.5 Nairobi City County Air Quality Regulations

Nairobi County experiences rapid industrialization and urbanization that contributes to the deteriorating state of air quality, posing a potential health risk to its growing population. The main pollutants emitted from different sources within Nairobi City include particulate matter (PM2.5 and PM10), Ozone (03), black carbon, nitrogen oxides (NOx), carbon monoxide (CO), Methane (CH4), Sulphur Oxides (SOx), Ammonia (NH3) and volatile organic compounds (VOCs) all of which have adverse health and environmental impacts. While some of these pollutants are emitted due to the inefficiency of combustion processes, many others are generated due to fuel properties, chemical reactions, and lack of tailpipe controls. Particulate matter emissions at the national scale are dominated by industrial emissions, tailpipe emissions from the transport sector and residential combustion.

Controlling Air Pollution requires a collaborative management approach by national and county governments. The Kenyan Constitution 2010 stipulates in Article 42 that every Kenyan is entitled to a clean and healthy environment. The fourth schedule of the Constitution assigns county governments the function of controlling Air Pollution within their jurisdiction.

The City County Government in partnership with UN Environment and other stakeholders developed Nairobi City's first Air Quality Action Plan (2019- 2023). The action plan identified broad overlapping actions to build the scientific evidence base for policy interventions for air quality management;

- Raising public awareness on the health and environmental impacts of air pollution;
- Developing effective approaches for air quality management and
- Building an effective implementation and enforcement programme for air quality legislation.

The city has already taken several measures to combat air pollution, including instituting the Nairobi City County Air Quality Bill (2021), a Climate Action Plan (CAP), and partnering with the World Resource Institute (WRI) to conduct an emissions inventory.

Nairobi is in the process of installing networks of low-cost sensors to gather and share data. It is also becoming the host of Clean Air Catalyst's third pilot project, working with local authorities to improve air quality monitoring and data collection in the most impacted communities. In the future, Nairobi plans to further enhance air quality communication as well as update its strategies for building codes and renewable energy as it aims to reach net-zero energy production by 2050.

CHAPTER 3

CASE STUDIES OF INITIATIVES IN DIFFERENT GEOGRAPHICAL AND SOCIO-ECONOMIC CONTEXTS

These cities are selected for their commitment to advancing ambitious policies that address the dual challenges of air pollution and climate emissions, geographic diversity, air pollution and emissions intensity engaged civil society, strong political interest and leadership, scalability potential, and capacity to implement action plans, among other metrics. These case studies illustrate the effectiveness of the initiative in different geographical and socio-economic contexts.

3.1 Leaders in Air Quality Regulations

3.1.1 London, UK

At COP26 in 2021, London Mayor, Sadiq Khan, called for the creation of Breathe Cities to build on the success of Breathe London to help more cities address the global air pollution crisis.

The initiative harnesses existing efforts by Bloomberg Philanthropies and the Clean Air Fund to track air pollution and shape public advocacy and policy measures to reduce pollution in cities. It also utilizes C40's efforts to increase global commitments to clean air, support mayors in implementing ambitious air quality actions, and create forums for mayors and city staff to scale solutions.

London continues to be recognized as a leader in air quality regulation, having faced severe pollution problems during the Industrial Revolution. London's participation in the Breathe Cities Initiative has further reinforced its commitment to improving air quality. A key component of London's strategy is the **Ultra-Low Emission Zone (ULEZ)**, which was introduced in 2019 to restrict the entry of high-emission vehicles into the city Centre.

Since the introduction of ULEZ, air quality in central London has improved significantly. According to a 2020 report by the London Air Quality Network, nitrogen dioxide (NO2) levels in the ULEZ zone dropped by 44% compared to pre-ULEZ levels in 2016 (London Air Quality

Network, 2020). Additionally, particulate matter (PM2.5) concentrations have decreased by 27%, marking a substantial improvement in air quality.

In London, before the implementation of the Ultra-Low Emission Zone (ULEZ) in 2019, nitrogen dioxide (NO2) levels in central London averaged 89 $\mu g/m^3$ annually. Following the introduction of ULEZ, NO2 levels dropped to 50 $\mu g/m^3$ by 2020, a 44% reduction (London Air Quality Network, 2020). Similarly, PM2.5 concentrations in central London fell from 18 $\mu g/m^3$ in 2016 to 13 $\mu g/m^3$ by 2020, marking a 27% decrease.

3.1.2 Accra, Ghana

Accra, the country's capital, struggles with PM2.5 pollution, with levels far exceeding WHO guidelines. This is largely due to road transport (especially older vehicles and minibuses known as "Tro-tros"), industrial activities, and domestic sources like biomass burning for fuel. In response, Ghana has introduced policies such as motor vehicle emission standards and initiatives to improve public transport through the Ghana Urban Mobility and Accessibility Project, which seeks to regulate older vehicles and encourage electric vehicle usage.

3.1.2.1 Greater Accra Metropolitan Area (GAMA) Air Quality Management Plan (2017)

The Greater Accra Metropolitan Area (GAMA) region, which includes Accra, has faced significant air quality challenges due to urbanization, industrial activities, and vehicle emissions. To combat this, Ghana's EPA implemented an Air Quality Management Plan (AQMP) for the region. The plan aims to reduce particulate matter concentrations, particularly in high-risk areas like busy streets and industrial zones. It also proposes motor vehicle emissions standards and ambient air quality regulations for pollutants such as sulfur dioxide (SO2) and nitrogen dioxide (NO2).

The AQMP highlights the need for cross-sectoral collaboration between government agencies, local authorities, and private industries to ensure its success. However, like many initiatives in Sub-Saharan Africa, the plan faces hurdles such as poor monitoring capacity and inadequate public awareness of air quality issues.

This demonstrates Ghana's commitment to improving air quality through regulatory measures and strategic planning. However, the country continues to face challenges such as limited data, inadequate monitoring infrastructure, and coordination among relevant stakeholders. Nevertheless, these efforts provide a foundation for future improvements in air quality management.

Accra's air quality improvements have been equally notable. PM2.5 concentrations in urban areas of Accra averaged 70 μg/m³ in 2019. By 2022, following the introduction of cleaner fuels, better waste management practices, and enhanced monitoring systems, PM2.5 levels had declined to 60 μg/m³, representing a 15% reduction (Clean Air Fund, 2024.)[25](.

3.1.3 Johannesburg, South Africa

Johannesburg has focused on reducing emissions from the industrial sector, which is one of the largest contributors to air pollution in the city. In 2021, the City of Johannesburg Metropolitan Municipality published 'Air Pollution Control By-laws' for the city that include strict enforcement of the prohibitions and regulations for industrial zones, vehicle testing, and open burning inspection, which should improve city air quality and reduce CO2e emissions.

3.1.4 Kampala – Uganda

In Kampala, Uganda, air quality regulations have been shaped by significant challenges, particularly related to pollution from transportation, industrial emissions, residential combustion, and waste burning. These issues are compounded by climate change, which is exacerbating air pollution problems.

The Kampala Capital City Authority (KCCA) has been actively involved in formulating strategies to address these challenges. One key initiative is the **Kampala Air Quality Action Plan**, which aims to reduce pollution through various measures, including waste reduction, increasing green spaces, paving roads to reduce dust, and promoting green mobility solutions like electric vehicles.

[25] https://www.cleanairfund.org/clean-air-africas-cities/accra/

These initiatives are critical since Kampala's pollution levels significantly exceed World Health Organization (WHO) guidelines

Additionally, the **AirQo project**, a leading research initiative based at Makerere University and funded by Google, has played a crucial role in improving air quality monitoring. AirQo has developed low-cost sensors that provide real-time data on pollution levels, accessible to both policymakers and the public through a mobile app. This technological innovation is part of Kampala's broader efforts to address air quality issues using artificial intelligence and data-driven solutions

These regulatory efforts are bolstered by Uganda's national air quality regulations, enacted under the **2024 National Environment (Air Quality Standards) Regulations**, which prohibit emissions of harmful pollutants from various sources. In conjunction with national efforts, Kampala has committed to long-term strategies such as reducing short-lived climate pollutants (SLCPs) in alignment with global environmental targets.

These initiatives illustrate Kampala's evolving approach to tackling air pollution, combining regulatory action with innovative technology and public awareness campaigns.

3.1.5 Addis Ababa – Ethiopia

Air quality regulations in Addis Ababa have evolved in response to the city's growing pollution issues, largely driven by rapid urbanization, increased vehicle emissions, and industrial activities. The city faces significant air quality challenges, with particulate matter (PM2.5 and PM10) levels regularly exceeding World Health Organization (WHO) guidelines. Key sources of pollution include vehicle emissions, residential combustion (charcoal and firewood), and waste burning.

One of the key regulatory efforts is the **Air Quality Management Plan (AQMP)**, developed by the Addis Ababa Environmental Protection and Green Development Commission (AAEPGDC). This plan outlines measures to manage and reduce air pollution. It includes a baseline characterization of air quality, projected emission trends, health burden assessments, and institutional commitments to improve air quality monitoring and enforcement of air quality standards. The plan is expected to be updated every five years to incorporate new data and technology, helping improve public health outcomes by reducing pollution-related deaths.

The Ethiopian Environmental Policy, established by Proclamation 295/2002, lays the foundation for air quality regulation. It mandates the Environmental Forestry and Climate Change Commission (EFCCC) to set and enforce national environmental standards. Other agencies such as the Ministry of Transport and Addis Ababa Transport Authority also play a role, particularly in monitoring vehicle emissions.

Recent studies show that air pollution in Addis Ababa has worsened over the past decades. For instance, research revealed that between 1974 and 2018, air pollution increased by 76%. The lack of a city-specific AQMP means that air quality monitoring and management are still largely under development, but current efforts aim to model pollution dispersion and assess the impact of potential emission reduction strategies.

Although the government has taken steps to improve air quality, including launching emission reduction scenarios and collecting long-term air quality data, more comprehensive and systematic regulation is needed to address Addis Ababa's growing air quality issues.

CHAPTER 4

POLICY-MAKING AND THE LAW: SOME BASIC PRINCIPLES IN KENYA

1.1 Law Making and the Constitution

Every person engaged in the legislative process must consider certain mandatory considerations before and during the process. Courts and independent tribunals also consider the factors discussed in this Part when construing policies and legislative instruments developed by the Executive and endorsed by respective legislative bodies at either level of Government.

These ideals spring from the Constitution of Kenya, 2010. The Guide, and specifically this Part, seeks to identify, consolidate and simplify the mandatory tenets, values and principles of the Constitution that ought to be applied and considered by all actors involved in one way or the other in the legislative process. These considerations may be summarized under the following rubrics—

(a) constitutional issues;
(b) international treaties and conventions ratified by the State;
(c) territorial Jurisdiction;
(d) conflict of law;
(e) national law and policy;
(f) Policy parameters;
(g) statutory harmony;
(h) ethical and other concerns;
(i) technical soundness or practicality concerns;
(j) public participation; and
(k) Cost-benefit analysis as part of the process of Regulatory Impact Assessment (RIA), which will be explained later in the document.

1.2 The Legislative Process

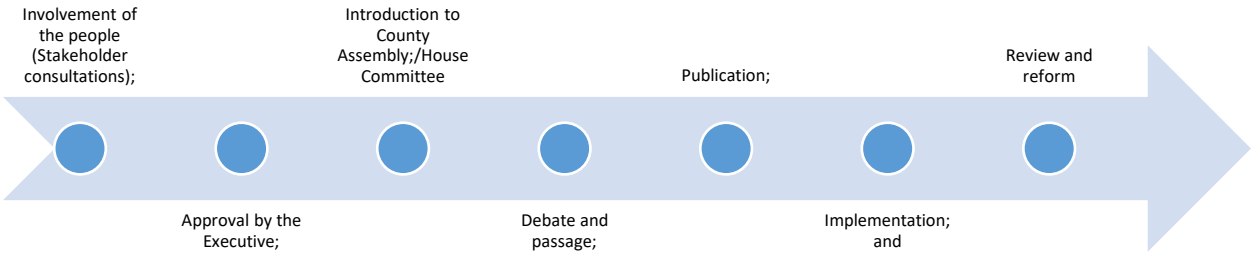
As already explained in the preceding Parts of this report, the development of legislation is a significant aspect of governance in modern democratic States. For starters, it is a process which involves many stakeholders. Article 1 of the Constitution declares that all sovereign power (including legislative authority) belongs to the people and is delegated to, among others, Parliament and County Assemblies. The remit of this Part of the Guide is to give a synopsis of the practical application of these broad constitutional dictates.

i. The County Executive;
ii. Members of the County Executive Committee;
iii. County Attorney;
iv. County Assembly;
v. The Public; and
vi. The Civil society and other non-state actors.

1.3 The Role of the County Assembly

One of the key functions of the County Assembly is to make laws in the exercise of its legislative authority as provided for in Article 185 of the Constitution and Part II of the Fourth Schedule to the Constitution. The County Assembly is mandated to make laws and exercises its legislative power through Bills passed by the Assembly and assented to by the Governor.

It is in this regard that this process of development of the Nairobi City County Air Quality Regulation will follow the following steps:



1.4 Public Participation in The Policy Making Process

One of the most important features of the Kenyan constitutional framework is the requirement of public participation in governance and other administrative activities. Specifically, the provisions of the following Articles are pertinent—

i. Article 10 recognizes public participation as one of the national values;
ii. Article 27 provides for equal treatment of all persons, while affirmative action in governance is provided for in Articles 54 and 56 of the Constitution;
iii. Article 35 provides for the right of access to information held by the State or another person which is necessary for the exercise of any right or fundamental freedom;
iv. Article 118 requires Parliament to conduct its business openly and to facilitate public participation and involvement in the legislative and other business of Parliament and its committees. It also prohibits Parliament from denying the public and media access to its sittings unless there are any justifiable reasons. Article 196 contains a similar requirement for County Governments; and
v. Article 119 provides for the right of persons to petition Parliament to consider any matter within its authority, including enacting, amending or repealing any legislation.

Public participation as the premise on which devolution is anchored is addressed under section 87 of the County Governments Act ("CGA") which among other things provides for—

a. access to information and data relevant to and related to policy formulation;
b. reasonable access to the process of formulating policy and other government programs;
c. protection and promotion of minorities within counties; and
d. recognition of non-state actors in the formulation and implementation of policies.

It is envisaged in the Constitution and law that the public may participate as individuals or as organized groups representing minorities and other interests. Equally, civil society has an entry point under the law to engage policymakers and the government in policy formulation.

1.5 Consultation with Affected State Entities and Actors

Consultation in the process of law-making is critical. The idea here is that problems to be addressed or opportunities to be embraced may be interrelated thus requiring solutions and input of various State and non-state actors. To this end, the Government and its entities must work as a whole. The consultation will be broadened to ensure that all affected entities or persons likely to be affected by the regulation contribute to the process in its formative and influential stages for value addition and to avert possible delay, fiscal and other implementation constraints. That the Constitution underscores this principle of consultation cannot be overemphasized.

1.6 Contextualization and Customization of Model Laws

The regulation development will adopt a model law contextualization and customization approach. The purpose of a model law is to establish a useful framework which enables legislative bodies to have some uniformity in their governance, organization, and management. It helps institutions to conduct their functions smoothly and effectively discharge their responsibilities.

In adopting a model law, the experts will ensure that the County Assembly is entitled to make modifications to the extent necessary to meet its needs. The use of model regulation is an appropriate vehicle for other county governments to enable them to harmonize, modernize and

standardize their legislation. It is expected that county governments will use this regulation to make adjustments in order to accommodate local requirements that vary from county to county and where strict uniformity is not desirable.

In the Kenyan context, the idea of developing model laws for counties was intended to provide an acceptable tool to achieve some degree of unification of the county government's legal and institutional frameworks. It is in this regard that the project will adopt the National Air Quality Regulations as a model law. The regulation will seek to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It will provide for the establishment of emission standards for various sources such as mobile sources (motor vehicles) and statutory sources (industries) as outlined in the Environmental Management and Coordination Act, 1999. It will also cover any other air pollution source as may be determined by the County Executive Committee Member in consultation with the Nairobi City Air Quality Working Group. The regulation will provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas.

In conclusion, the policy-making and legislative processes in Kenya are intricately woven into the fabric of the Constitution of Kenya, 2010, which emphasizes the importance of public participation, consultation, and adherence to legal principles. As demonstrated throughout this chapter, effective lawmaking is not merely a procedural formality but a collaborative endeavor involving various stakeholders, including state and non-state actors. The requirement for public input not only enhances transparency and accountability but also empowers citizens, ensuring that laws reflect the diverse interests of the population. Additionally, the adoption of model laws serves as a critical tool for harmonizing and customizing regulations to meet local needs while promoting uniformity across the county governments. Ultimately, by adhering to these foundational principles, Kenya can foster a legislative environment that is both responsive and responsible, paving the way for effective governance and sustainable development.

CHAPTER 5

CONCLUSION

Air quality regulation is a global imperative that requires coordinated action from governments, international organizations, and civil society. Through initiatives like the Breathe Cities Initiative, cities around the world are taking meaningful steps to address air pollution and its associated health risks. London, Accra, Addis Ababa, Johannesburg and Nairobi are just a few examples of cities that have benefited from this initiative, with significant potential for improvements in air quality. Continued investment in air quality monitoring, public awareness, and scalable interventions will be essential to sustaining these improvements and ensuring cleaner, healthier cities for future generations.

Air quality regulation in Africa is a complex but essential task as urbanization and industrialization continue to grow across the continent. The Breathe Cities Initiative have provided resources to three African cities to improve air quality. While there is still work to be done, the progress seen in cities like Accra, Nairobi, and Johannesburg demonstrates that a data-driven, community-engaged approach can lead to significant improvements in air quality.

It can then be deduced that Kenya's air quality challenges are a lot similar to those of Ghana, and thus, the Ghanaian experience provides important lessons. The success of Ghana's regulations can be attributed to the integration of multiple stakeholders. Kenya could benefit from similar partnerships, focusing on urban planning, emissions regulations, and the deployment of air quality monitoring networks to better track pollution trends. Kenya's ability to mitigate its urban air quality issues will depend on the strength of its regulatory frameworks and its commitment to cross-sector collaboration.

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