



**NAIROBI CITY
COUNTY**

NAIROBI CITY COUNTY AIR QUALITY ACTION PLAN (2025-2029)





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FOREWORD



It's a pleasure to be able to launch our policy response to one of Nairobi's most pressing problems.

In the last decade or so, respiratory infections have become the third-most common cause of death in Kenya. Recent research suggests that air pollution (particulate air pollution, in particular) has been above WHO recommendations for at least forty years now. The worst-affected neighbourhoods in the Nairobi are often the least able to bear the burden; indeed, we have seen research showing that air quality during the pandemic actually declined in some of our poorer neighbourhoods because residents there switched to cheaper forms of energy.

So, we have: a complex problem, decades old, that seems to be worsening; whose burdens are very unequally borne; and which causes quite serious health problems that now clearly show up in our mortality numbers.

What are the causes? Unsurprisingly, very much the same as any quickly growing city in the world. First, Kenya has had quite rapid population growth in the last few decades (around 2.5% a year over the last twenty years), and our cities have borne the brunt of it: our national urbanisation rate has run around 4.5% a year for the last five years; Nairobi had grown by around 3.8% over the same period. Second: incomes and so mobility have risen: many more people can buy a car, or can pay what it costs to travel a little further for work or education.

The urgency of the matter has been clear to me from the start. In 2023, air quality was incorporated into the Nairobi County Integrated Development Plan (2023-2025) as a priority area.

I've made it clear that my government is resolved to restore the quality of Nairobi's air, and that we're open to partnerships that align with that aim. I am especially grateful to all our allies in the cause; let me single out the Clean Air Fund for special praise, since their support, not least for the development of the Nairobi Air Quality Action Plan (2025-2029), has been invaluable.

Environmental governance in Nairobi has been hobbled by the difficulty of building coalitions for the defence of air quality, and that in part because there has been so little reliable public information. The real-time monitoring and shared information we have been able to roll out with the help of the Clean Air Fund has strengthened the hand of the coalition to defend our air quality. May their example inspire emulation.

I ask you, the people of Nairobi, and every ally and friend we have to join us in protecting and restoring our air quality so that no child in this city will ever again struggle to breathe through a cloud of diesel smoke on their morning journey to school.

A handwritten signature in black ink, appearing to read 'Sakaja', written over a horizontal line.

H.E. Hon. Sakaja Arthur Johnson, EGH.
Governor, Nairobi City County

MESSAGE FROM THE COUNTY EXECUTIVE COMMITTEE MEMBER, GREEN NAIROBI



Over the last five years, Nairobi City County Government has been implementing its first Air Quality Action Plan (2019–2023). The plan laid a strong foundation that has led to notable achievements, which include: establishment of an air quality regulatory framework that anchors our actions in law and policy, installation of more than 87 low-cost air quality monitors and two reference - grade monitors across the city, development of an online public data portal that allows residents and stakeholders to access information openly and transparently, progressing work on the design of a comprehensive data management system to support evidence-based decision-making and advancing the process of finalizing Nairobi’s Air Quality Regulations, which will operationalize the Nairobi City County Air Quality Act, 2022. These milestones demonstrate our determination to ensure Nairobians breathe cleaner and safer air.

The Nairobi City County Air Quality Action Plan 2025–2029 builds on these achievements. It reflects global best practices while tailoring interventions to Nairobi’s unique realities. It recognizes that the challenge of air quality is cross-sectoral — touching on transport, energy, waste management, industry, and urban planning. The plan aligns seamlessly with the Nairobi Climate Change Act of 2024, reinforcing our integrated approach to resilience and sustainability. Our task now is to move from planning to action. The next steps are clear: to strengthen institutional capacity so that each department integrates air quality measures into daily operations, to mobilize resources — financial, technical, and human, to ensure implementation is both ambitious and realistic, and to engage our communities and the public. Clean air is not only a policy issue but also a shared responsibility and this calls for the establishment of strong monitoring and evaluation systems that will keep us accountable and measure our progress.

As the leadership of Nairobi City County, we have a duty to safeguard the health, wellbeing, and productivity of our residents. Clean air is not a privilege, it is a fundamental right. The Nairobi City County Air Quality Action Plan 2025 -2029 has been developed through a collaborative and inclusive process, with active participation by diverse experts and stakeholders from within and outside the Nairobi City County Government. I therefore urge enhanced collaboration with the City County Government to make Nairobi a model African city in advancing clean air, climate resilience, and sustainable urban development. We envision “a Nairobi with clean and healthy air for all”.

Let us walk this journey together, with commitment and shared purpose, so that the generations to come will inherit a city where the air is not only breathable but truly healthy.

A handwritten signature in black ink, appearing to read 'Maureen Njeri', positioned above a horizontal line.

Ms. Maureen Njeri
County Executive Committee Member – Green Nairobi

ACKNOWLEDGEMENT

The Nairobi City County Government acknowledges efforts of all city stakeholders and experts who took part in the process of developing the Nairobi City County Air Quality Action Plan (2025-2029). The development of this Plan leveraged the political leadership and commitment of Nairobi City County Governor, His Excellency Sakaja Arthur Johnson, and dedicated efforts of the county executive team led by the County Executive Committee Member (CECM) in charge of Green Nairobi, Ms. Maureen Njeri. Further, the continued support and engagement of the Chief Officer, Mr. Geoffrey Mosiria and the Director of Environment and Climate Change, Mr. John Paul Malawi made this work a success. The Nairobi City County Government Climate Change and Air Quality Monitoring Unit technical officers led by the Deputy Director, Mr. Maurice Kawai equally offered immense support and input in the development of this action plan.

The County Government appreciates input from key stakeholders in the Nairobi Air Quality Working Group (N-Air). They include but not limited to National Environment Management Authority (NEMA), National Transport and Safety Authority (NTSA), Kenya Association of Manufacturers (KAM), National Public Transport Alliance (NAPTA), Stockholm Environment Institute (SEI), University of Nairobi, Kenyatta University, Jomo Kenyatta University of Agriculture and Technology, GROOTS Kenya, AirQo, Health Effects Institute (HEI), World Resources Institute (WRI), Environmental Capacities and Sustainability Institute (ECAS), Air Quality Systems – East Africa (AQSEA), Kenya Meteorological Department (KMD), KIKAKA Community Based Organization and Kusudi Cause Communications.

This work was supported by the Clean Air Fund (CAF) through the Breathe Cities Initiative. The initiative is a collaboration of CAF, C40 Cities, and Bloomberg Philanthropies with a shared commitment to enhance air quality and foster healthier, more resilient cities. We recognize the efforts of Dr. Victor Indasi and Ms. Lydia Okolla of CAF. The action plan development process has been implemented in partnership with Environmental Compliance Institute (ECI). We appreciate the efforts of the core technical team led by Dr. Godwin Opinde, supported by Mr. Gerphas Opondo and Ms. Ago Sam. We look forward to continued engagement during the action plan implementation phase.

EXECUTIVE SUMMARY

Nairobi City County hosts Nairobi, the capital city of Kenya and the commercial hub for East Africa, with an ever-growing population of over 5 million. The City County contributes to over 30% of Kenya's GDP and hosts the largest concentration of air pollution generating activities in Kenya. The city is characterized by dense, low - income areas where exposure to multiple sources of air pollution such as open waste burning, traffic emissions, and household energy use, raises risks for chronic and acute diseases such as respiratory tract infections and cardiovascular diseases. Recent health impact assessments estimate that long-term exposure to poor air quality contributed to between 400 and 1,400 premature deaths in Nairobi. This context demonstrates the need to implement effective air quality management, while harnessing the economic gains of clean air. This is the city's second air quality action plan, whose mission is to improve air quality in Nairobi through inclusive, sustainable, and resilient practices for a healthy city. It envisions a Nairobi with clean and healthy air for all. It establishes goals and specific objectives in line with this vision, summarized below:



GOAL 1

To develop emission reduction targets for at least five priority sectors

Objective 1.1: Develop emission reduction targets for transport, waste management, construction, industry and urban agriculture.



GOAL 2

To reduce emissions of harmful air pollutants by supporting sectoral programmes that contribute to clean air and climate change mitigation

Objective 2.1: Reduce and control emissions from vehicles in the city.

Objective 2.2: To support sustainable transport planning initiatives.

Objective 2.3: Reduce and control emissions from waste management in the city.

Objective 2.4: Fairly improve air quality in densely populated low-income settlements.

Objective 2.5: Support national and county government programmes targeting reduction of Greenhouse Gas (GHG) emissions.

Objective 2.6: Reduce and control emissions from urban agriculture.



GOAL 3

To enhance public education and awareness on air quality management

Objective 3.1: To build upon existing education and awareness activities and provide a comprehensive and sustainable awareness and communication programme for air quality management.

Objective 3.2: To support research efforts to determine the extent of health effects of poor air quality on the population of Nairobi City.



GOAL 4

Enhance compliance and enforcement of air quality standards within the City County

Objective 4.1: To monitor criteria air pollutants which present a threat to health, well-being or the environment.

Objective 4.2: To strengthen the capacity of the Nairobi City County in air quality management, compliance and enforcement.

Objective 4.3: To enforce the current and future regulations on air quality management.

Objective 4.4: To support Nairobi City County departments and facilities in maintaining environmental compliance.

Objective 4.5: To conduct annual compliance and air quality monitoring on listed facilities within the City County.

Objective 4.6: To involve the city communities in informing planning and implementation of air quality programmes.

The specific actions, actors, indicators of achievements, means of verification and potential sources of funding are detailed in the implementation matrix of this plan.

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ACRONYMS

AADT	Average Annual Daily Traffic
CAF	Clean Air Fund
CASELAP	Centre for Advanced Studies in Environmental Law and Policy
CBD	Central Business District
CBO	Community Based Organization
CEC	County Executive Committee
CIDP	County Integrated Development Plan
COPD	Chronic Obstructive Pulmonary Disease
ECI	Environmental Compliance Institute
EMCA	Environmental Management and Coordination Act
GCP	Gross County Product
GoK	Government of Kenya
GVA	Gross Value Added
HEI	Health Effects Institute
KNBS	Kenya National Bureau of Statistics
LEZ	Low Emission Zone
LPG	Liquefied Petroleum Gas
NCCAQAP	Nairobi City County Air Quality Action Plan
NCCG	Nairobi City County Government
NEMA	National Environment Management Authority
NMT	Non-Motorized Transport
NIUPLAN	Nairobi Integrated Urban Development Master Plan
PWD	Persons with Disability
TUMI	Transformative Urban Mobility Initiative
WHO	World Health Organization
WRI	World Resources Institute

DEFINITION OF TERMS

Multi-dimensional Poverty: A concept that views poverty as more than just low income, encompassing multiple dimensions of deprivation, like health, education, and standard of living. It recognizes that people can be poor not only financially but also in terms of access to basic services, opportunities, and overall well-being. The drivers of multidimensional poverty in Nairobi are nutrition, housing, information, education, and economic activity.

Criteria Pollutants: These are a set of six common air pollutants known to be harmful to human health and the environment. The pollutants are particulate matter, ozone, carbon monoxide, sulphur dioxide, nitrogen dioxide, and lead.

Liveable City: It is a place that offers a high quality of life for its residents. It's more than just a comfortable place to live; it's also resilient, with competitive social, economic, and environmental advantages.

Healthy Environments: Areas where all people have good air quality and access to adequate drinking water, safe sanitation, and waste management.

CHAPTER

01:

INTRODUCTION

1.1 Overview of Nairobi City County

Nairobi is the capital and largest city of Kenya. Nairobi City County constitutes the city and its surrounding areas, delineated and established as the 47th county in Kenya. The City County is the main administrative centre for the Republic of Kenya, hosting the national government executive, the National Assembly, the Senate, the Judiciary and the County Government. It also hosts headquarters of the United Nations Environment Programme, diplomatic missions, international and multinational institutions, and other local, regional, and intercontinental dignitaries in different areas of operation. The city prides itself as the centre of diplomacy, a hub of finance and commerce, and a trend setter in East and Central Africa. Founded in 1899 as a rail depot on the Uganda-Kenya railway and later established as the capital city in 1963, Nairobi's growth is propelled by its strategic location, attractive physical and economic features (Nairobi City County Government, 2023a).





1.1.1 Location and Size

Nairobi City County borders Kiambu County to the North and West, Kajiado County to the South, and Machakos County to the East. The county has a total area of 696.1 km² and is located between longitudes 36° 45' East and latitudes 1° 18' South. It lies at an altitude of 1,798 metres above sea level. The city is situated in South-Central Kenya, 140 km (87 miles) south of the Equator. It is adjacent to the eastern edge of the Rift Valley, and to the west of the city, are the Ngong Hills. Mount Kenya is situated north of Nairobi, and Mount Kilimanjaro is towards the south-east (NCCG, 2023a). Figure 1 shows the position of Nairobi City County and its administrative units.

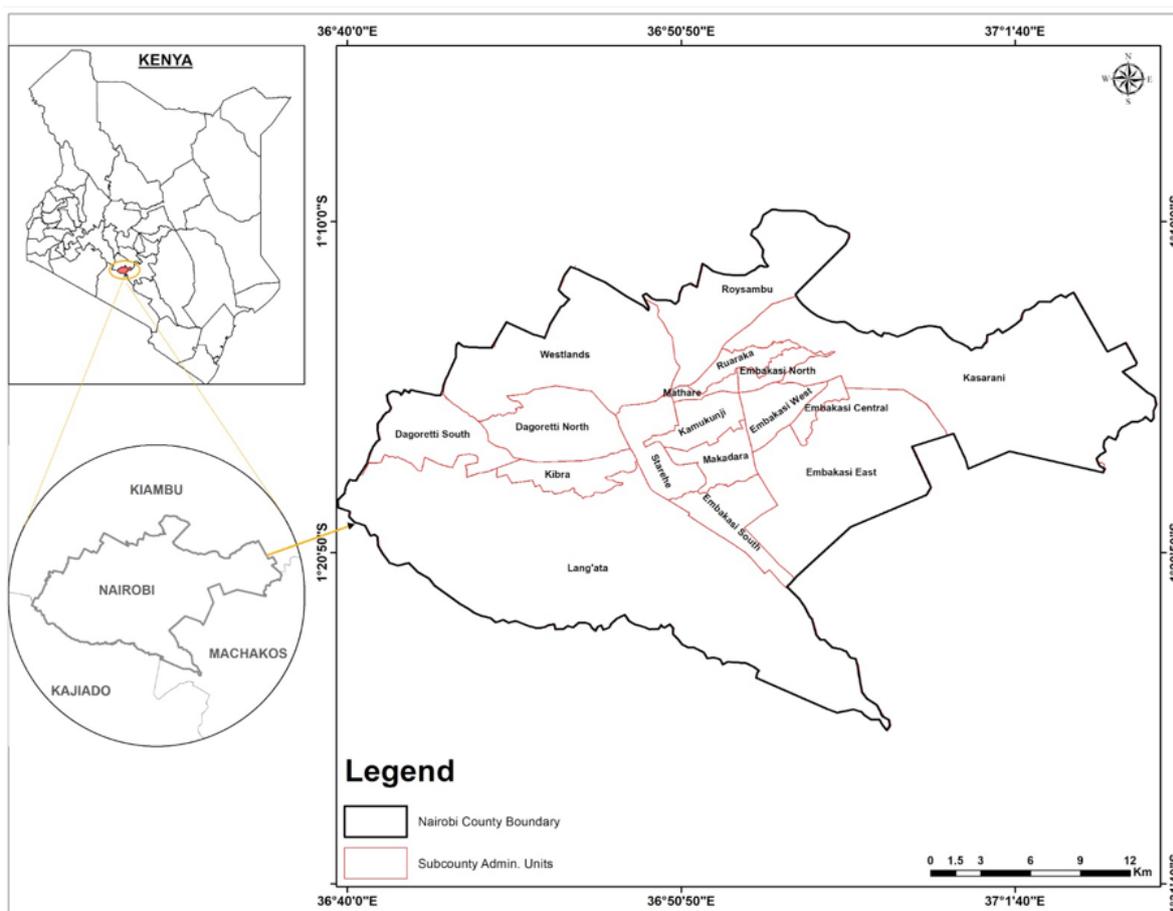


Figure 1: Position of Nairobi City County and its Administrative Units

1.1.2 Climate

Nairobi City experiences a subtropical highland climate. The temperatures range from 9 °C from June-July up to 28 °C from December-March. With a mean annual rainfall of 900mm, the city experiences a bimodal pattern of rainfall. The short rains of up to 500mm fall from October-December and long rains of up to 1550mm fall from March-June. The relative humidity is at 60% and wind speed of 15km/h.

1.1.3 Land Use and Land Use Changes

Nairobi experiences significant land use changes, primarily driven by rapid urbanization and population growth. Regarding forest coverage, the city has a total of 23.19 km² with these forests being Ngong Forest to the south, with plains towards the National Park, Karura Forest to the north surrounded by steep-sided valleys and the Nairobi Arboretum. However, these forests are threatened by increasing infrastructure development. The rivers traversing the county, ending up in Athi River include the Nairobi, Ngong, and Kabuthi rivers (NCCG, 2023a). The City has seven distinct land uses, namely residential, commercial, industrial, institutional, recreational, transport and agricultural (NCCG, 2023b). However, the rapid urbanization has resulted in challenges such as unplanned and uncoordinated urban growth, inadequate infrastructure, deterioration of the urban environment, and increasing poverty.

1.1.4 Governance and Administrative Structure

The Nairobi City County Government (NCCG) has two arms, namely:

- i. Nairobi City County Assembly; This is the legislative arm of the county government and is headed by the Speaker, who presides over the plenary sittings of the County Assembly. The County Assembly is responsible for legislation, oversight, and representation. The Assembly comprises elected and nominated members who perform their functions through the organs of the Assembly, namely the plenary and the various committees of the Assembly.
- ii. Nairobi City County Executive Committee; This is the executive arm of the county government, led by the Governor, the Deputy Governor and Members of the County Executive Committee. The County Executive Committee consists of the County Public Service and the County Executive Committee Members. This Committee is the highest policy-making organ of the county and is responsible for the operations of the respective sectors within the county.

The County Government administration is comprised of 17 sub counties and 85 wards (Table 1)

23.19 Km²

Forest Coverage



The County Government administration is comprised of

17

Sub Counties and

85

Wards

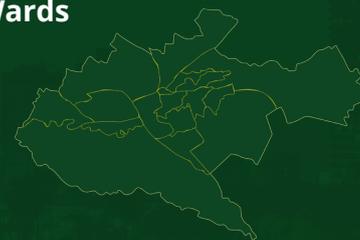
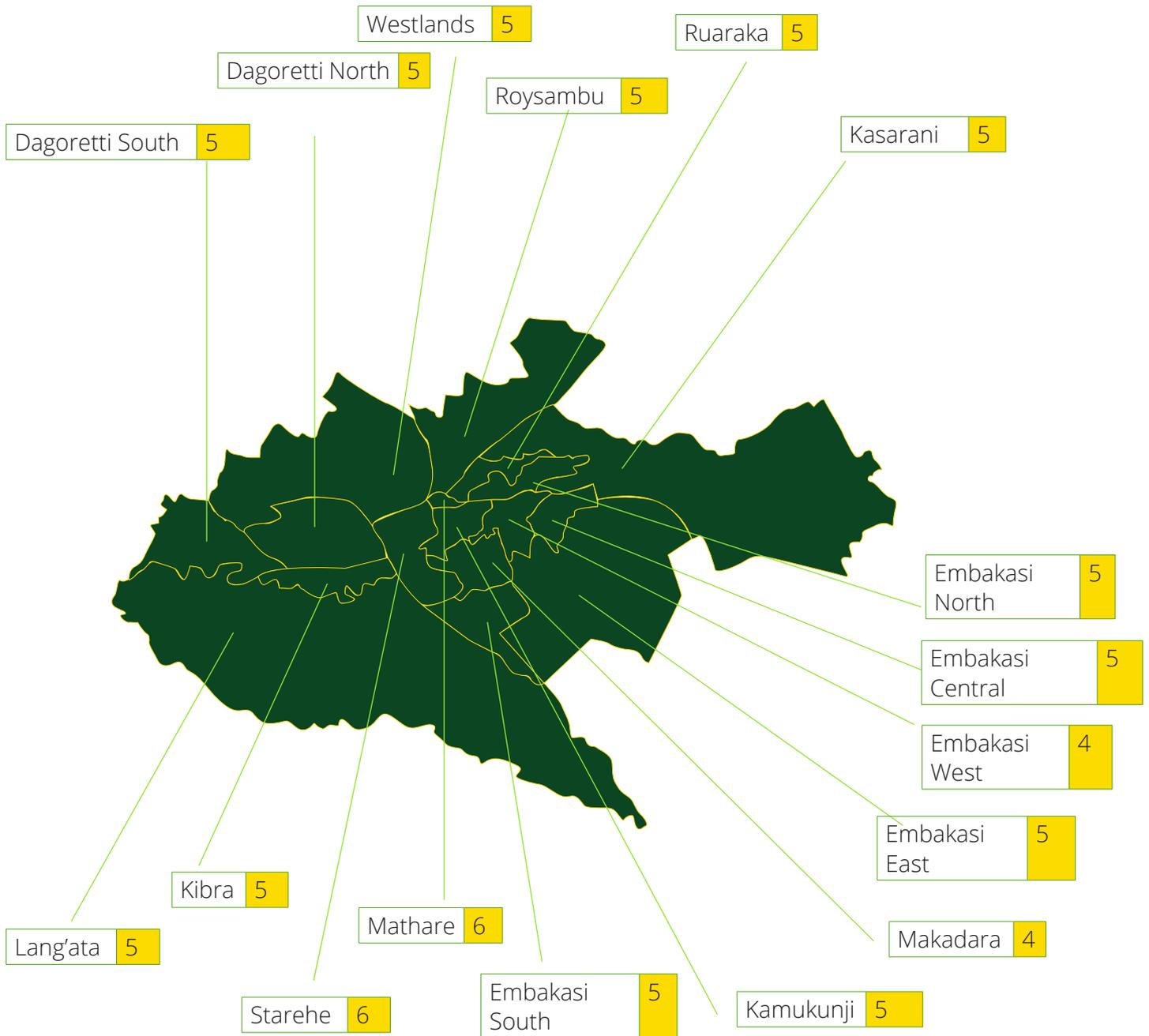


Table 1: Sub Counties and Number of Wards in Nairobi



1.1.5 Population

According to the Kenya Population and Housing Census 2019, Nairobi County's night - time population was 4,397,073 people, with 2,192,452 (49.9%) being male, 2,204,376 (50.1%) being female and 245 (0.006%) being intersex. The county had 1,506,888 households and an average household size of 2.9. It is projected that the population will increase to 5,049,701 by 2027 with 2,529,991 (50.01%) being males and 2,519,710 (49.99%) being females (figure 2). The County Budget Development Plan 2022/2023 estimates that approximately, an extra one million people flock to the city during the day. The population density is projected to increase from 6,237 persons per km² in 2019 to 7,163 persons per km² in 2027 (KNBS, 2022). Mathare, Kamukunji, Makadara and Kibra are the four most densely populated sub counties with 68,855, 24,389, 15,795 and 15,481 people per km² respectively in 2019 and it is projected that the densities will increase to 79,074, 28,009, 18,139 and 17,779 persons per km² in the respective sub counties. Due to its national and regional significance, the county experiences a positive net migration with a net migration of 230,027 individuals in 2019 (KNBS Housing and population Census). Migration is mainly driven by men with 641,817 recent migrations into Nairobi as of the 2019 census.

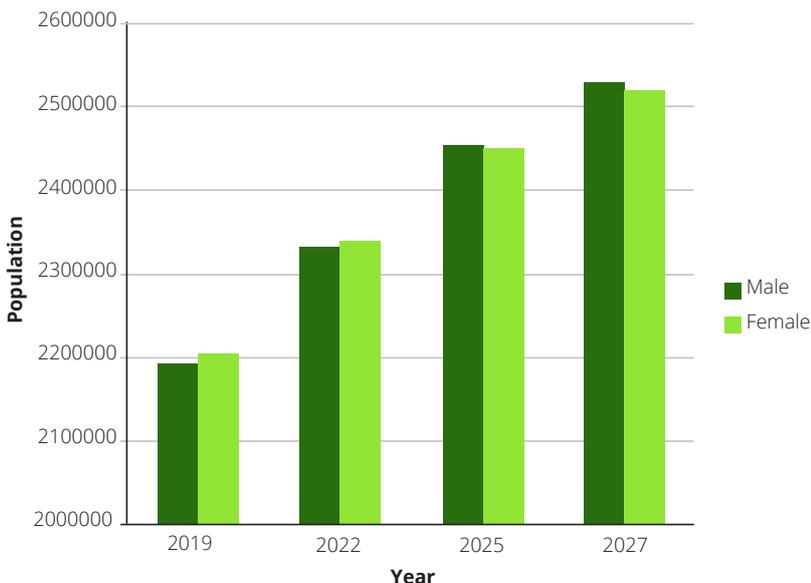


Figure 2: Nairobi City County Population Projections
Source: KNBS (2022)

Population of children under 5 years, primary school going children (6-13 years), secondary school going children (14-17 years), youths (15-29 years) and the elderly (65+ years) form 9%, 15%, 11%, 34%, and 1.3% of the total population. About 1.46% (56,346) of the individuals above five years of age live with at least one form of disability. Amongst the Persons with Disabilities (PWD), the majority are female at 54.5% of the total while men constitute 45.5%. The most prevalent forms of disability are visual disability, mobility, and cognitive with 18,790, 14,551, and 6,712 individuals in 2019, respectively. Comparatively, the age group 55+ had the highest proportion of PWDs compared to the total number of people in the age category at 8.5%, followed by the age group 35-54 at 1.6%.

4,397,073

People

Nairobi County's Night-Time Population



1,506,888

Households





Ksh.

40,291,150

The total revenue as of 2024



3,002,314

people,

**economically active population
aged between 15-64 years**



Home to

80%

**of the total industries in
the country**



16.6%,

**rate of people with low
incomes for Nairobi**

1.1.6 Socio-Political and Economic Status

Nairobi is a socially vibrant city composed of a population of diverse origin from both within and outside the Republic of Kenya. It is characterised by socio-spatial inequalities shaped by colonial legacies that resulted in the concentration of a population of low income in informal settlements. The rich cultural diversity within the city as a result of migration, promotes innovation, creativity, and broadens perspectives leading to increased productivity. However, the City suffers from cultural diversity - related challenges such as prejudice, stereotyping, unequal access to opportunities, social stratification and potential cultural conflict. These challenges are pronounced through the nature of politics in the city.

On the economic status, , Nairobi's contribution to the Country's total Gross Value Added (GVA) was 27.5% in the period 2018-2022 while the Gross County Product (GCP) per capita was Ksh. 723,335 (KNBS, 2023). The total revenue as of 2024 for the City, was 33.3 billion, largely generated from equitable share, conditional grants and own source revenues (NCCG, 2024a). This is qualified by the City being a home to about 80% of industries and further has an economically active population aged between 15-64 years of 3,002,314 people. With the current projected estimate being 5,049,701 by 2027, the economic status is projected to rise, with the industries offering a wide range of employment opportunities for the people within and outside the County (NCCG, 2024b). In addition, the city has a national park which boosts tourism and a thriving hospitality industry, with a high concentration of the best and highly rated hotels. The city hosts the highest concentration of financial institutions including commercial banks, microfinance institutions, and forex bureaus making it a financial and commercial hub in Africa.

Further on the social dynamics and economic value for the active population, the rate of people with low incomes in Nairobi is 16.6%, which is lower than the national rate of 35.7%. Considering other non-monetary deprivations, the City has a multidimensional poverty rate of 12.6%, which is lower than the low incomes rate (KNBS, 2023, NCCG, 2024b). When disaggregated by age groups, it represents 7.3% of children in Nairobi, which is 45 percentage points lower than the national average of 52.5%. Among the youths, the rate is 13.7% compared to a national average of 48.1% while for the elderly population, it is rated at 6.7% compared to a national average of 55.7%. Figure 3 indicates the share of population living below the poverty line in various Nairobi City County administrative sub counties.

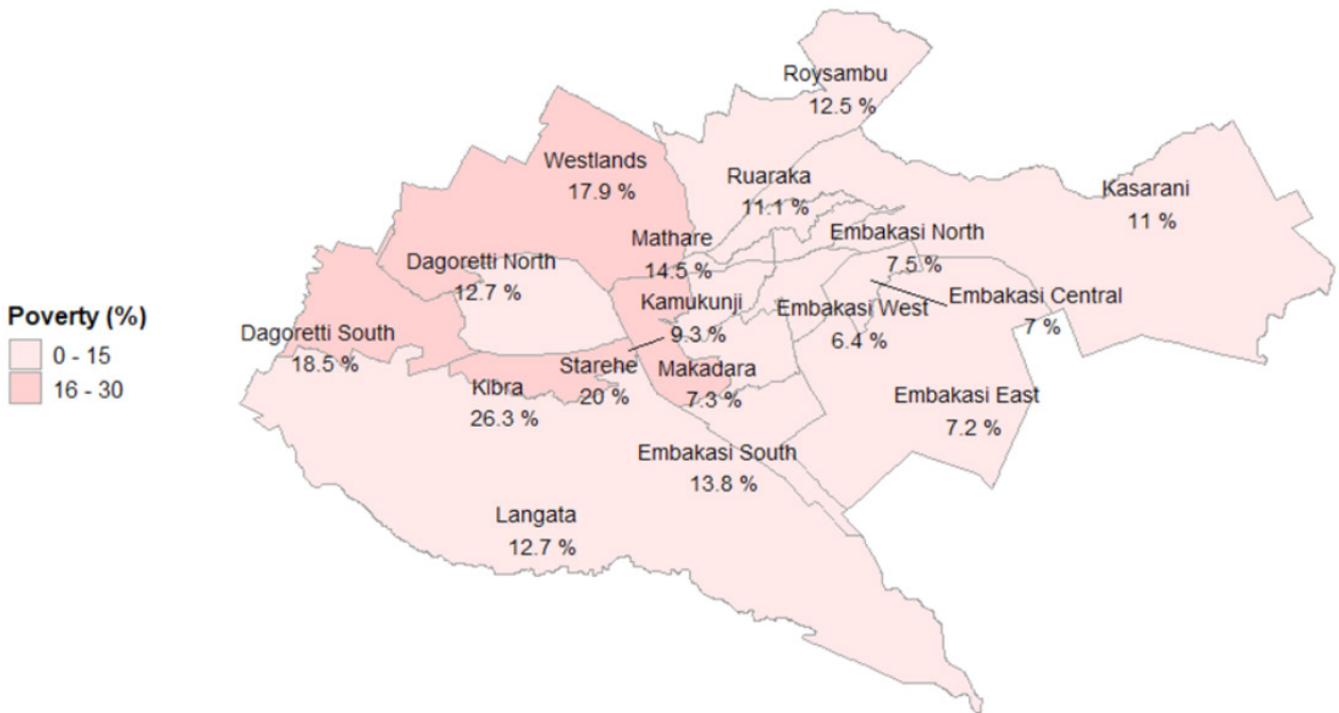


Figure 3: Share of population living below poverty line per administrative Sub County
 Source: Commission for Revenue Allocation (2022). Kenya County Statistical Fact Sheets.

Nairobi City County serves as a benchmark for urban development and innovation, and thus the development of the Air Quality Action Plan 2025-2029 not only contributes to achieving the City's vision, "A City of order, dignity, hope, and opportunities to all" but also provides a case for best practice in Sub-Saharan Africa.

JICA (2014) report estimates a doubling of number of households owning cars in Nairobi from

29.9%

in 2013

to

58.6%

by 2030



1.1.7 Transport

The city is connected to other counties and internationally through railway, road, and air. It hosts the Jomo Kenyatta International Airport (JKIA), which is the biggest airport in East and Central Africa, and the Wilson airport making it the focal point for major aviation activity in the region. Key road systems include the Northern, Eastern, Southern, and dual carriageway Western Bypasses. The 27-km Expressway is another significant asset that connects the city centre from the Nairobi-Nakuru Highway to Mlolongo Town in Machakos County. These systems aim to alleviate traffic congestion in the Central Business District (CBD) and improve access to the suburbs. The railway has the diesel run-commuter rail service and transports about 13,000 passengers daily, as they have a higher carrying capacity than on-road mobile sources. Informal transport is prevalent throughout the city. The densely populated areas, informal settlements and areas in the outskirts of the urban core are dominated by informal transport such as matatu's (minibuses) and boda bodas (motorcycles) serving as last mile connectivity. However, lack of an integrated public transport system has led to issues such as congestion, road accidents and environmental pollution.

Walking and public transport are the main means of transport in Nairobi City accounting for 39% and 46% of the modal split (TUMI, 2022). JICA (2014) report on Integrated Urban Development Master Plan for Nairobi estimates a doubling of the number of households owning cars in Nairobi from 29.9% in 2013 to 58.6% by 2030. UNEP (2021) report on quantification of short-lived climate pollutants reduction from soot free bus strategy projects growth trend of passengers and freight transportation in Nairobi - business as usual scenario (figure 4)

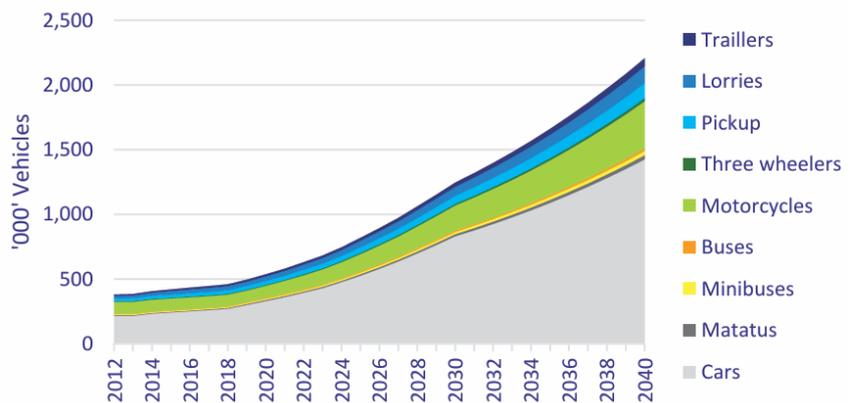


Figure 4: Projected growth trend of passenger and freight transportation in Nairobi
Source: UNEP (2021)

1.1.8 Waste Management

Nairobi generates approximately 2,400 tonnes of waste every day, of which only 38% is collected and less than 10% recycled. The remaining 62% is disposed of at the dumpsites, illegally dumped on roadsides and waterways, or burned, and this releases toxic air emissions and particulate matter. Dumping and burning is particularly common in low-income urban areas, which are home to over 2.5 million people (NEMA, 2024). It is projected that by 2030 the city will be generating approximately 3,990 tonnes every day.

The collection and transportation of solid waste is managed by the county through licensed or contracted private service providers (PSPs) and community-based organisations (CBOs). These parties enter into contracts with households, public or private businesses, with waste being dumped in designated dumpsites within the specific county of operation. Water provision and wastewater management within the county is managed by the Nairobi City Water and Sewerage and Company. The waste collection system under the county is based on the organization, their service area, collection method and equipment used. The county government itself operates within the CBD, collecting waste through the station method using trucks with tipping function. For contractors, the private companies operate in the sub-counties, using station collection with trucks having tipping/ no tipping function. PSPs operate in high and middle – income residential areas, collecting waste door-to-door using trucks with no tipping function. The last group is the CBOs and local youth groups who operate in low - income residential areas, collecting waste door-to-door using handcarts.

Nairobi generates approximately

2,400 tons

of waste every day,

only

38%

is collected and less than

10 %

recycled.



CHAPTER

02:

CURRENT STATUS OF AIR QUALITY MANAGEMENT IN NAIROBI CITY

2.1 Concerns on Air Pollution

Air pollution is a global public health emergency, attributed to 99% of the world's population living in places where air quality exceeds the World Health Organization (WHO) limits as of 2019 (WHO, 2024.) About seven million deaths – one in eight deaths worldwide – are due to air pollution-related non-communicable diseases such as stroke, lung cancer, chronic respiratory disease and heart complications, accounting for one - third of those deaths (State of Global Air, 2019). Air pollution is also responsible for more than 50% of childhood pneumonia deaths. It is the second leading environmental risk factor in Africa. These risks are attributed to rapid urbanization and economic growth especially in developing countries (WHO, 2025).

Air pollutants can be either gases or particulate matter which affect the environment and public health in different proportions. WHO (2024) classifies six pollutants that have adverse effects on human health and the environment as criteria pollutants. These pollutants include particulate matter ($PM_{2.5}$ and PM_{10}), carbon monoxide (CO), ozone (O_3), sulphur dioxide (SO_2), nitrogen oxides (NO_x) and lead (Pb). Table 2 indicates the criteria pollutant, potential sources, effect on human health and the environment.





Table 2: Criteria Pollutants and Effects to Human Health and Environment

PM_{2.5} & PM₁₀

Complex mixture of small solid or liquid particles suspended in air.



Sources

- Combustion activities from vehicles and industries.



Health Effects

- Respiratory complications such as asthma & bronchitis.
- Cardiovascular diseases.
- Lung cancer.



Environmental Effects

- Reduces visibility.
- Contributes to acid rain.
- Affects plant growth.

NO₂

Red-brown gas that is highly reactive.



Sources

- Vehicle emissions.
- Power plants.
- Industrial processes.



Health Effects

- Irritates respiratory system.
- Decreases lung function.
- Increases risk of respiratory infections.



Environmental Effects

- Contributes to acid rain.
- Eutrophication.
- Ground-level ozone formation.

SO₂

Colourless gas with a pungent odour.



Sources

- Burning of fossil fuels.
- Smelting of mineral ores.



Health Effects

- Causes respiratory diseases.
- Aggravates asthma.
- Long-term exposure can damage lungs.



Environmental Effects

- Contributes to acid rain.
- Harms ecosystems.
- Damages buildings and monuments.

CO

A colourless, odourless gas.



Sources

- Incomplete combustion from vehicles and industrial processes.

Health Effects

- Reduces oxygen delivery to body tissues.
- Causes headaches, and dizziness.

Environmental Effects

- Contributes to ground-level ozone formation.

O₃

Occurs naturally in the earth's stratosphere but as ground-level ozone from chemical reactions of NO_x and VOCs in presence of sunlight, leading to harmful effects.



Sources

- Emitted from stationary and mobile sources.

Health Effects

- Causes chest pain and throat irritation.
- Worsens respiratory diseases.
- Decreases lung function.

Environmental Effects

- Damages crops, forests and wildlife.
- Contributes to smog formation.

Dioxins and Furans

Human – caused from combustion activities.



Sources

- Emitted from stationary sources such as incinerators and open burning of waste.

Health Effects

- Cancer – causing.
- Negative effects to the immune and reproductive systems.

Environmental Effects

- Build up in food chain while interfering with the naturality of air, water and soil.

Methane

Coal and natural gas combustion, naturally from wetlands.



Sources

- Emitted from breakdown of decaying matter in waste management, agricultural practices and energy production.

Health Effects

- Poor air quality resulting from ground level ozone.

Environmental Effects

- Contributes to climate change.

2.2 Recommended Air Quality Guidelines

The WHO air quality guidelines recommend levels and interim targets for particulate matter, ozone, nitrogen oxide, and sulphur dioxide which are common air pollutants. However, countries are expected to use the guidelines in diverse ways depending on their unique local conditions, technical capabilities, economic capacity, air quality management factors, and other social and political factors (WHO, 2024). Table 3 indicates the recommended 2021 air quality guidelines compared to the 2005 air quality guidelines.

Table 3: Recommended 2021 AQG levels compared to 2005 air quality guidelines

Pollutant	Averaging Time	2005 AQGs	2021 AQGs
PM _{2.5} , µg/m ³	Annual	10	5
	24-hour ^a	25	15
PM ₁₀ , µg/m ³	Annual	20	15
	24-hour ^a	50	45
O ₃ , µg/m ³	Peak Season ^b	-	60
	8-hour ^a	100	100
NO ₂ , µg/m ³	Annual	40	10
	24-hour ^a	-	25
SO ₂ , µg/m ³	24-hour ^a	20	40
CO, mg/m ³	24-hour ^a	-	4

In Kenya, the National Environment Management Authority (NEMA) regulates air quality nationally through the Environmental Management and Co-ordination (Air Quality) Regulation, 2024. These regulations provide ambient air tolerance levels for various air pollutants under the fourth schedule as well as limits for industrial, residential and controlled areas and at property boundary for general pollutants. The latter does not apply for residential premises in designated industrial areas (table 4).

Table 4: Ambient Air Quality at Property Boundary for General Pollutant

Pollutants	Time Weighted Average	Property boundary
Particulate matter (PM)	Annual average	50 µg/m ³
	24 hours	70 µg/m ³
Oxides of Nitrogen (NO _x)	Annual average	80 µg/m ³
	24 hours	150 µg/m ³
Sulphur oxides (SO _x)	Annual average	50 µg/m ³
	24 hours	125 µg/m ³
Hydrogen Sulphide	24 hours	50 µg/m ³
Ammonia	24 hours	100 µg/m ³

2.3 Air Quality Monitoring in Nairobi City County

A requisite to air quality management is baseline establishment through monitoring stations, to provide data on the status of air pollution, information on the highest pollutant concentration and transboundary pollution (WCK, 2025). However, Nairobi city, like many cities in developing countries, is at the nascent stage of establishing an air quality monitoring network. The city has recently installed two reference - grade monitoring equipment at Mama Lucy Hospital and the Nairobi Fire Station, as well as another 87 low-cost air quality sensors across the city to measure particulate matter. Thus, there is inadequate data on continuous monitoring and baseline study at the time of development of this action plan. However, some studies that range from a 3-year period to months have been undertaken in the city between 2001 to 2024 and have indicative data on the state of air quality in the city. This data will partly inform the air quality action planning.

2.3.1 Air Quality Trends and Patterns

Several ad-hoc studies on air quality in Nairobi city were reviewed, and generally indicate that air pollution with reference to Particulate Matter, Black Carbon, Ozone and Volatile Organic Compounds vary according to location, time of the day, and in some instances, the pollutant concentrations are higher than WHO standards. A study by CASELAP (2021) suggests that seven out of the eight planning zones recorded levels above the recommended WHO standards. Figure 5 shows the concentration of PM_{2.5} and population densities in various sub counties within the city and details on type of study, methodology, location, duration, findings and recommendations of various studies are summarized in table 5.

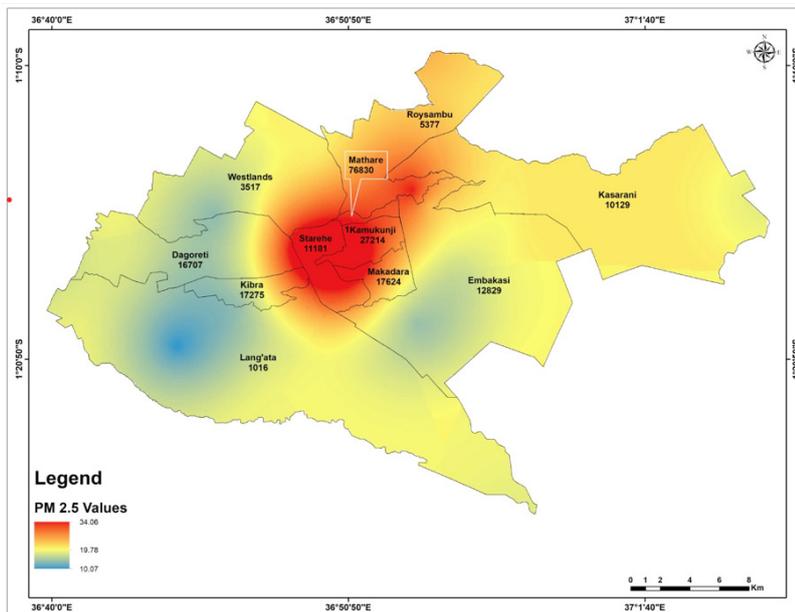


Figure 5: Map of Nairobi sub counties indicating ambient air PM_{2.5} concentration and population density (in numerics)
Source: CASELAP – University of Nairobi Policy brief on air quality in Nairobi City, 2021; KNBS

Table 5: Recent studies on the Criteria Pollutants

Fine Particulate Matter Air Pollution and Health Implications for Nairobi, Kenya (Oguge et al., 2024).

Location & Duration



21st August 2019 – 20th August 2022 at University of Nairobi and the US Embassy.

Methodology (Equipment used & Analysis)



BAM-1022 Monitor and Teledyne T640 Monitor.

Results



The daily (24-hour) mean (\pm SEM) PM_{2.5} concentrations was 19.2 \pm 0.6 (μ g/m³). Sundays had the lowest daily concentrations, increasing on Mondays and remained high through Saturdays. By season, the pollutant concentrations were lowest in April and highest in August. The mean annual concentration was 18.4 \pm 7.1 (μ g/m³), which was estimated to lead to between 400 and 1,400 premature deaths of the city’s population in 2021.

Conclusions & Recommendations



The long-term population exposure to PM_{2.5} was 3.7 times higher than the WHO annual guideline of 5 μ g/m³ and estimated to lead to a substantial burden of attributable deaths. An updated regulation targeting measures to reduce vehicular emissions is recommended.

Spatial Variation of Fine Particulate Matter Levels in Nairobi Before and During the Covid-19 Curfew: Implications for Environmental Justice (deSouza et al., 2021).

Location & Duration



City-wide from 16th March 2020 – 5th May 2020.

Methodology (Equipment used & Analysis)



Sensirion SPS 30 sensors (8 units) on motorbikes.

Results



The highest concentration levels were found in Kariobangi, Mathare, Umoja, and Dandora.

Concentration levels increased during curfews in Kahawa, Kasarani, and Ruaraka.

Conclusions & Recommendations



Policies used to tackle the pandemic aggravated the existing air pollution inequalities in the city.

Spatial data is crucial to understand the structural inequalities faced due to air pollution burdens.

Assessment of Air Pollution and Prevalence Levels of Respiratory Diseases in Mukuru Informal Settlement in Nairobi City, Kenya for PM_{2.5} & CO (Kipter, 2023).

Location & Duration



May – December 2021 in Mukuru Slum and University of Nairobi as a control site.

Methodology (Equipment used & Analysis)



PM_{2.5} – Harvard Impactor Sampler.

CO – Lascar CO Portable Electrochemical Sensor.



Results

Ambient PM_{2.5} concentration levels exceeded WHO's guidelines of 15µg/m³ over the 24hr period during both the dry and rainy seasons.

During the dry season, the 24hr mean CO concentration levels did not exceed WHO's 6.1ppm standard except one household that used charcoal. During the rainy season, the 24hr mean CO concentration levels exceeded WHO's guideline of 6.1ppm standard except one household that used the kerosene stove.



Conclusions & Recommendations

A high prevalence of respiratory diseases was noticed within healthcare facilities in Mukuru during both seasons.

Recommendation on having a national air quality standard for PM_{2.5} in residential areas, continuous monitoring and enforcement of frameworks, health data management policies, use of clean fuels for cooking and zoning of hazardous sites.

Black Carbon Emissions from Traffic Contribute Substantially to Air Pollution in Nairobi, Kenya (Kirago et al., 2022).

Location & Duration



Data from March 2014 – February 2015 was used for analysis of this study done in 2022.

Methodology (Equipment used & Analysis)



Aethalometer and application of traffic-centric monitoring.



Results

High BC concentrations, averaging $3.9 \pm 1.2 \mu\text{g}/\text{m}^3$ throughout the year were noticed.

Concentrations in curb side zones and bus termini exceeded 20 µg/m³, accounting for over 30% of the PM_{2.5} mass.deaths of the city's population in 2021.



Conclusions & Recommendations

These elevated levels of black carbon present a substantial health risk to Nairobi's residents.

Analysis of Surface Ozone and Its Precursors with Relevance to Urban Air Pollution in Nairobi, Kenya (Apondo et al., 2018).

Location & Duration



January 2013 – December 2016
in 14 sites around Nairobi city
including major urban roads.

Methodology (Equipment used & Analysis)



Surface Ozone Analyzer using UV photometry.

Mobile Air Pollution Laboratory using gas chromatographs.

Analysis through trend evaluation for the 4 years and comparative assessment from mobile versus stationary sources.



Results

Day time O₃ levels peak during midday hours, with bimodal peaks in March, of 32 ± 5 ppb hourly mean concentrations and September with 36 ± 5 ppb hourly mean concentrations.

Diurnal variations in O₃ were within the WHO limits. (50 ppb for 8 hours).



Conclusions & Recommendations

Mobile precursor measurements were found to be within the WHO limits.

The study concluded vehicular sources to be the most contributors of O₃.

Monitoring networks were recommended to create a larger data base.

Volatile Organic Compound Composition of Urban Air in Nairobi, Kenya and Lagos, Nigeria (Cordel et al., 2021).

Location & Duration



June 2019 (1 week period) in
4 sites around Waiyaki way
roundabout and University way.

Methodology (Equipment used & Analysis)



Sample collection into sorbent tubes through pump & sample analysis through multidimensional agilent 7890 GC-MS system.



Results

The results from Nairobi closely mirrored those observed in other cities within Sub-Saharan Africa, particularly in areas near major roadways. This roadside study, specifically around the Waiyaki Way and University Way roundabouts, showed elevated VOC levels linked to traffic emissions.



Conclusions & Recommendations

The levels of VOCs in Nairobi were significantly higher than those recorded in cities across the United States and Europe. The potential for ozone formation due to these VOCs was notable.

Study highlighted the need for effective air quality management strategies to mitigate pollution and protect public health.

Seasonal Multisite Low-Cost Sensor Measurements to Estimate Spatial and Temporal Variability of Particulate Matter Pollution in Nairobi, Kenya (Waiguru et al., 2025).

Location & Duration



Buruburu, Kenyatta University City Campus, University of Nairobi, Marurui, IPA offices (Westlands), US embassy and Ngong road.

January 2020 – December 2022.

Methodology (Equipment used & Analysis)



Sensor nodes developed by Clarity, A Met One Beta Attenuation Monitor 1020 (BAM).



Results

A clear seasonal variation, with lower $PM_{2.5}$ concentrations during the rainy seasons (OND, MAM) and higher concentrations during the dry seasons (JF, JJAS) observed at urban background sites.

Lower inter-annual variability than seasonal variations. Inter-annual variability did not appear to be influenced by the mobility restrictions during the peak of the COVID-19 pandemic.

The annual mean $PM_{2.5}$ across the three years of our data, $18.3 \mu g m^{-3}$, is well in excess of the WHO threshold of $5.0 \mu g m^{-3}$. Similarly, the daily averages from our seven-month measurements at seven different sites exceed the $15.0 \mu g m^{-3}$ WHO threshold on most days.



Conclusions & Recommendations

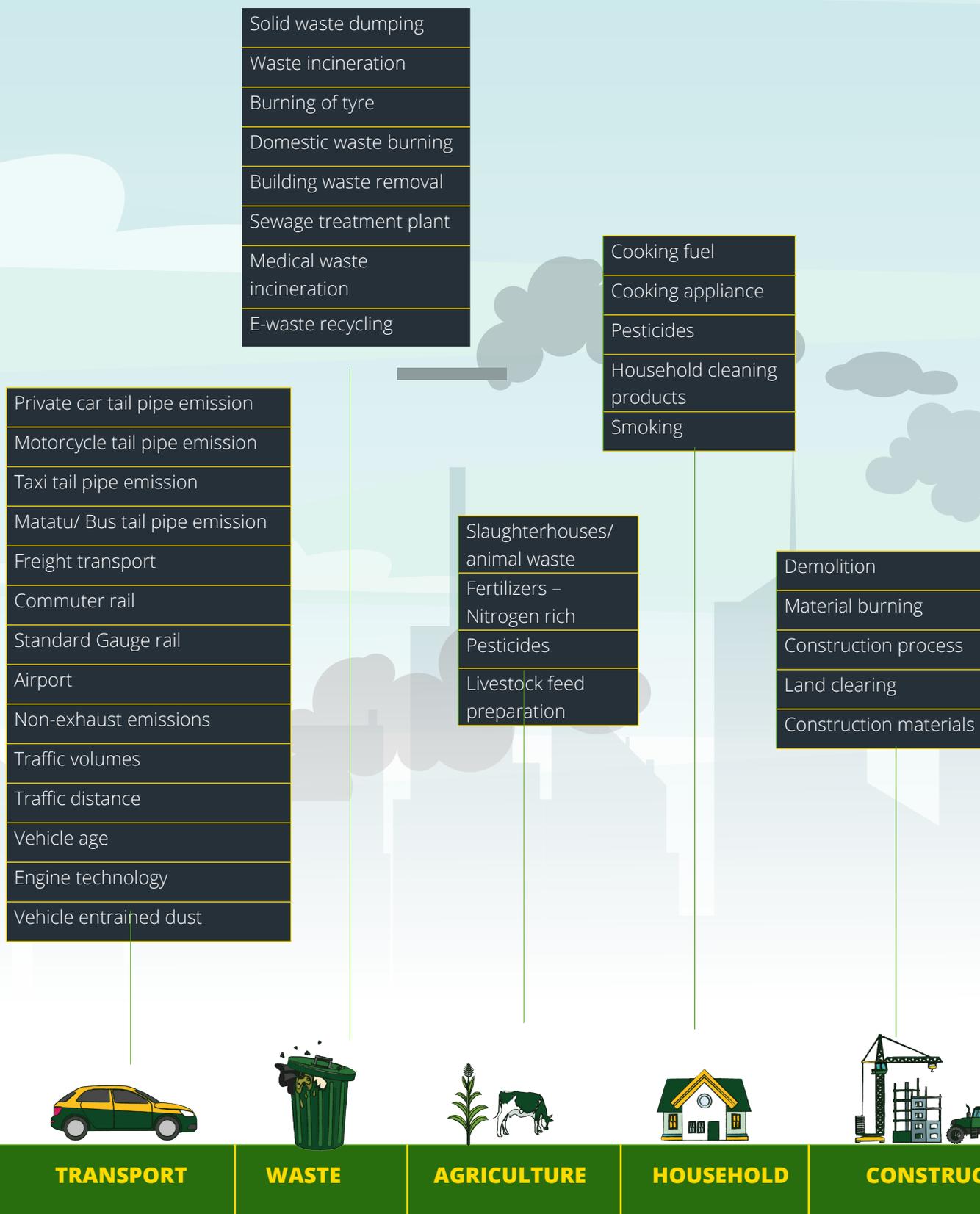
Residential emissions—particularly from cooking—may be contributing to both evening and daytime peaks.

For mixed traffic/ residential sites, the timing of evening peaks suggests that residential emissions are a key factor: evening emissions peak around 9 p.m., well after the evening traffic rush hour of 6 – 8 p.m. The impact of these local sources is also documented by the fact that seasonal average $PM_{2.5}$ concentrations (June to December 2021) drop from traffic/residential-related, to urban background, and finally to suburban sites.

2.4 Sources of Air Pollution in Nairobi City County

Sources of air pollution are traced to activities undertaken within the city. A review of literature and discussions in the preceding sub-sections indicate that sources of air pollution in the City County can be summarized as per table 6.

Table 6: Sources of Air Pollution in Nairobi City County



Boilers
Coating
Smelters
Light industries processes
Machinery

Print shops
Combustion/ cooking
Food processing

Wind-blown dust

Storage
Handling of dusty stock piles of other sectors

Diesel generators
Biogas

Stone quarrying
Cut and fills in quarrying
Dusty stockpiles from quarrying activities



INDUSTRIAL

COMMERCIAL

NATURAL

OTHERS

**ENERGY
GENERATION**

MINING

2.4.1 Energy Generation and Use

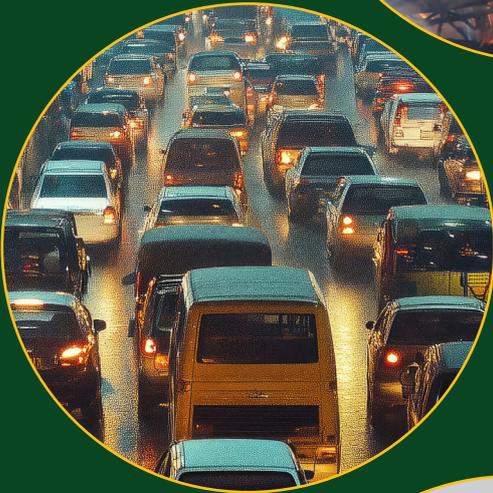
Energy production entails drilling or mining of fossil fuels that form part of a country's energy supply chain (IEA, 2025a). The energy sources prevalent in Kenya, both renewable and non-renewable are biogas, petroleum, nuclear, wind, hydro power plants, geothermal, coal and solar (GoK, 2024). These sources are transformed into useful forms such as fuels from crude oil as well as electricity and heat generation (IEA, 2025a). However, in the fight towards net zero, the transformation negatively accelerates climate change through the analogy of scope emissions explained as the direct and indirect emissions from sectors (Australian Government, 2025). The combustible fuels are used widely across sectors that contribute to air pollution. In Nairobi, these sectors are transport, waste management, housing, agriculture, industry, and energy, often leading to negative health effects (NCCG, 2020a; HEI, 2025). In evidence, 17.414tCO₂e of Kenya's CO₂ emissions is attributed to combustible fuels (IEA, 2025b). Narrowing down to Nairobi, with a population of 4 million, the CO₂ emissions are rated at 1.2million tCO₂e (KIPPR, 2022). In general, transport is rated highest contributor of emissions at 45% followed by waste management at 33% and industry at 22% (NCCG, 2020b).



*Transport is rated highest contributor of emissions at **45%** followed by waste management at **33%** and industry at **22%**.*

2.4.2 Sectoral Contributions

Other than energy production and consumption, the accelerators of urban air pollution are also tied to the dynamics of urban resilience. As documented in preceding sections, the population of Nairobi is set to continue increasing, coupled with increased waste production and infrastructure development. Urban areas like Nairobi are viewed as hubs for populations and investments (Kapucu, et al. 2022). The ability of these urban areas to measure resilience to new and continuing challenges, tied to the aforementioned sectors, is measured by resistance, recovery, adaptation, and transformation (Ribeiro et al. 2019).



The following sections build a case for air pollution in the City:



2.4.2.1 Transport

According to Oguge et al., (2024), the health and environmental risks from the transport sector are realized through ambient air pollution. The emissions from burning fuel by on-road sources include NO_x , $\text{PM}_{2.5}$, CO , CO_2 , SO_2 , O_3 , Volatile Organic Compounds (VOCs), black carbon (BC) and methane (CH_4). Within Nairobi, there is a high influx of second-hand fleet vehicles, making up 90% of all imported vehicles in the country. These vehicles contribute to air pollution in varying dynamics such as use of low-quality fuel, poor road infrastructure, low maintenance, and lack of vehicle emission regulations, hence limited enforcement. Nairobi is home to a significant portion of the country's registered vehicles, accounting for about 60% of the total fleet. In 2021, the city had approximately 2,612,335 vehicles active (operational fleet). Road transport is responsible for 40% of the $\text{PM}_{2.5}$ concentrations in the air.

Sitati et al., (2022), indicates that from 2014 to 2019, an average annual daily traffic (AADT) analysis was conducted to evaluate CO_2 emission levels from various modes of transport. The findings revealed that private cars were the largest contributors to emissions, responsible for 73% of the total CO_2 output, releasing an estimated 25.3 million gCO_2e . In contrast, public service vehicles (PSVs) emitted 6.89 million gCO_2e , while light-duty commercial vehicles produced 1.82 million gCO_2e . Heavy-duty vehicles accounted for 251,683 gCO_2e , and motorcycles contributed 181,054 gCO_2e . UNEP (2021), the report on quantification of short-lived climate pollutants reduction from soot free bus strategy, indicates that freight transportation, buses, minibuses and matatus are the main contributors to $\text{PM}_{2.5}$ and black carbon resulting from combustion of diesel fuel. It projects a rise in emissions to about 9,000 metric tonnes for $\text{PM}_{2.5}$, black carbon and methane to about 4,000 metric tonnes, and organic carbon to 2,000 metric tonnes by 2040 in a business-as-usual scenario.

With the challenges identified from an aging vehicle fleet and insufficient road infrastructure causing traffic congestion, the County Government has opportunities in improving planning by implementing the 2014-2030 Nairobi Integrated Urban Development Master Plan (NIUPLAN) and through partnerships with both national government and private entities. In planning for implementation, it is worth noting that this sector contributes to employment of the youth either formally or informally and therefore is a key part in transition discourse.



Road transport is responsible for 40% of the $\text{PM}_{2.5}$ concentrations in the air.

2.4.2.2 Waste Management

The main categories of waste in the city are solid waste and wastewater. Managing these streams has been a great challenge due to the high population, increased urbanization, infrastructure development and the need for disposal. The city produces between 3,000 to 4,000 tonnes of solid waste per day as accounted for by the influx of waste into the dumpsites (NCCG, 2024c).

Dandora, East Africa's largest dumpsite, located in Kenya, accounts for about 3,207 tonnes of waste per day (Climate-KIC, 2024). In terms of management, of the waste generated per day, only 10% is recycled while the other 62% is disposed of in the dumpsites. The remaining amount is accounted for through roadside illegal dumpsites and in waterways or through open burning (NEMA, 2023). The direct emissions from open burning lead to the release of toxic air emissions (Mebratu & Mbandi, 2022).

Nairobi's poor storm - water drainage leads to frequent flooding, which spreads polluted liquid waste across roads and settlements. As this waste stagnates and decomposes, it releases harmful gases, contributing to air pollution especially in densely populated informal areas lacking proper sanitation and waste disposal systems. The flooding impacts the local economy and enhances the vulnerability of populations in densely populated areas to waterborne diseases.

The challenges of effective waste management are attributed to illegal dumping, inadequate enforcement actions, financial constraints, poor dumpsite infrastructure and working conditions, waste cartels, inadequate budgetary allocation, no waste reduction strategies at the source and poor public awareness of the impacts of poor waste management on health and the environment (Gumo, 2018). To effectively address the concerns arising from poor waste management, the Ministry of Environment, Climate Change and Forestry has developed policies that require implementation such as the National Solid Waste Management Strategy, the Sustainable Waste Management Act, 2022, and the relevant solid waste regulations.

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The city produces
between **3,000 to 4,000**
tons of solid waste per
day

2.4.2.3 Household Indoor Air Pollution

At a global scale, Kenya's population of city dwellers was rated at 28% in 2020 and projected to be at 34% by 2030. For Nairobi, the population is set to increase at a growth rate of 4.1% from 2023 (KIPPRA, 2022). With a focus on energy production and use, the impacts on health and the environment have become a concern. This is seen through the release of greenhouse gases and resulting air pollution (Ritchie, 2020). At the household level, developing countries are seen to be highly impacted due to the use of fuels such as firewood, crop waste and dung. This has led to developing of respiratory diseases and premature death (Ritchie & Roser, 2024). According to KNBS (2019), 26.5% of City residents use paraffin as the preferred cooking fuel, 67.2% use liquefied petroleum gas (LPG), 2.7% use charcoal while 0.7% use firewood. For lighting, 96.5% of households use electricity, 1.7% use paraffin and 20.2% use solar energy. With a focus on informal settlements, Dianati et al. (2019) observe that the challenges tied to using these unconventional fuels are accelerated by poor housing infrastructure as well as high influx at 60% into industrial zones. This results in indoor air pollution, directly affecting the health of populations therein.

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26.5% of City residents use paraffin as the preferred cooking fuel, **67.2%** use Liquefied Petroleum Gas (LPG), **2.7%** use charcoal while **0.7%** use firewood

2.4.2.4 Agriculture

The city is categorized as an urban area, due to rapid urbanization and clearing of land for structural developments, leading to a reduction of green spaces (Oyugi, 2021). However, about 15.72% of Nairobi's land is dedicated to urban agriculture through livestock rearing and farming activities. These activities are livelihood resources for some city dwellers.



2.4.2.4.1 Livestock Farming

In Nairobi, Kenya, the International Livestock Research Institute (ILRI) operates its Mazingira Centre, a specialized environmental research and educational facility focused on studying and managing the environmental footprint of livestock systems, including air pollution from livestock. Research efforts include measuring emissions, improving animal nutrition, and promoting sustainable intensification of livestock systems to mitigate air pollution and greenhouse gases in the region (International Livestock Research Institute (ILRI), n.d).

Slaughterhouses in Nairobi, especially in Kiamaiko, are major sources of air pollutants. During animal processing, large amounts of organic waste (blood, urine, faeces, offal) are generated. If not properly managed, this waste decomposes and releases various gases and contaminants into the air (Arasha Soila, 2024).

2.4.2.4.2 Crop Production

According to NCCG (2020), urban agriculture is widely practiced as horticultural farming. The main vegetables grown include tomatoes, kales, spinach, cabbage, local vegetables, onions, capsicum, and carrots. Fruits grown include passion fruits, mangoes, bananas and avocado. The main food crops grown are maize, beans and potatoes on a small-scale basis especially in peri-urban sub-counties of Dagoretti South, Langata, Westlands, Kasarani and Roysambu. The emissions tied to this are from nitrogen-rich fertilizers, pesticides, herbicides and animal waste such as ammonia (NH_3), which combine with the air to form particulate matter, causing air pollution.

2.4.2.5 Industry

Industries are known for the production of goods, which helps a great deal in economic growth, employment creation and provision of finished products to markets. Such industries include manufacturing, chemicals processing, energy production, and construction among others. These industries are classified as stationary sources, and they use fossil fuels in running their machinery. The combustion of these fuels lead to production of emissions, currently accounting for 15% of PM_{2.5} concentration levels within NCC (Kirago et al., 2022; CAF, 2023).

Emissions from industries are dependent on the process type hence different emissions are expected (ACTS, 2020). High stack emission levels from industries are mainly attributed to the lack of or inadequate emission control technologies in place. Mixed land use or presence of incompatible projects within a given locality serves to exacerbate the impact of such emissions among the population. Whereas there is existing collaboration amongst national and county regulatory bodies through joint inspection of high-risk industries to monitor emissions compliance plans and also respond to public complaints raised against industries, there is a need to strengthen and scale up these joint inspections to enhance compliance with regulation especially on transboundary cases – from one county to another i.e. Kiambu, Machakos to Nairobi.



The combustion of fossil fuels lead to production of emissions, currently accounting for **15%** of PM_{2.5} concentration levels within NCC



2.5 Impacts of Air Pollution in Nairobi City County

2.5.1 Health Impacts

Air pollution (from both ambient and household sources) ranks as the second - leading risk factor for deaths across East Africa and was responsible for approximately 294,000 deaths in 2021 (HEI, 2025). According to the State of Global Air (2019), the entire Kenyan population lives in areas with PM_{2.5} concentrations are above the WHO Air Quality Guideline for healthy air, which was set at 10 µg/m³ at the time. This means that 100% of Nairobi's citizens were exposed to air pollution levels that exceed international safety standards and are still exposed currently even with the updated WHO Air Quality Guidelines in place of 5 µg/m³. Furthermore, only 21% of Kenya's population lives in areas that meet the WHO's least-stringent target of 35 µg/m³, indicating that the vast majority of residents face exposure to severely polluted air.

Recent health impact assessments estimate that long-term exposure to PM_{2.5} contributed to between 400 and 1,400 premature deaths in Nairobi in 2021, representing 5–8% of all adult non-accidental deaths. (Oguge et al., 2024). The burden is particularly acute in informal settlements, where exposure to multiple sources such as open waste burning, traffic emissions, and household energy use, raises risks for chronic and acute diseases such as respiratory tract infection and cardiovascular diseases (Clean Air Catalyst, 2023).

The health effects associated with air pollution exposure in the East African region according to HEI (2025) include: cardiovascular and respiratory diseases and adverse maternal and neonatal health outcomes including gestational diabetes, preeclampsia, premature birth, and low birth weight.

More specifically, air pollution is linked to:

89%

of COPD deaths

61%

of lower respiratory infection deaths

20%

of diabetes deaths

63%

of lung cancer deaths

56%

of stroke deaths

49%

of ischemic heart disease deaths

35%

of neonatal deaths



A study by Meme et al. (2023) comparing schoolchildren in the informal settlement of Mukuru and the affluent area of Buruburu found a significantly higher prevalence of respiratory symptoms in Mukuru whereby children currently wheezing compared as: 9.5% vs. 6.4%; and those having trouble breathing as 16.3% vs. 12.6% respectively. (Mukuru vs. Buruburu) However, asthma diagnosis rates were lower in Mukuru, indicating underdiagnosis and limited access to healthcare. Symptom severity and frequency were also greater among children in informal settlements.

A national analysis linked long-term PM_{2.5} exposures to increased symptoms of acute respiratory infections (ARIs) in children under 5 years. Children in high-exposure areas had 1.4 times greater odds of ARI symptoms per 10 µg/m³ increase in PM_{2.5}, with household use of biomass and kerosene further amplifying risk (Larson et al., 2022). Adults in Nairobi's informal settlements exhibit high rates of chronic bronchitis and chronic obstructive pulmonary disease (COPD), with PM_{2.5} exposure accounting for up to 89% of COPD cases within the East African region (HEI, 2025). Hospital admissions for cardiovascular events, such as myocardial infarction, increase during periods of elevated pollution, particularly in older adults and those with pre-existing conditions (Clean Air Catalyst, 2023).

HEI (2025) observes that prenatal exposure to PM_{2.5} is associated with increased risks of preterm birth, low birth weight, and stillbirth, especially in areas near industrial emissions or where solid fuels are used City – wide for cooking. Although city-specific death counts are not detailed, it is estimated that thousands of neonatal deaths in Nairobi may be attributed to household air pollution from solid fuels.

These few studies on impact of air pollution on health underscores that air pollution disproportionately affects Nairobi's poorest residents. Informal settlements experience the highest pollutant concentrations and the lowest rates of diagnosis and treatment for pollution-related illnesses. Children in these areas are less likely to receive inhalers or other appropriate care, and families face economic losses due to illness-related absenteeism and healthcare costs (Meme et al., 2023). Thus, exposing the socio-economic and environmental justice dimension of impact of air pollution on health.

2.5.2 Socio – Economic Impacts

The socio-economic impacts of air pollution in Nairobi present a complex interplay of public health crises, strained healthcare systems, and constrained economic productivity. With PM_{2.5} concentrations being 3.7 times WHO's guidelines (Oguge et al., 2024), the city faces an annual economic burden of about \$170 million (Abala, 2024), driven by healthcare expenditures, workforce productivity losses, and premature mortality. Broader economic projections suggest that Nairobi, along with five other major African cities, faces potential costs of \$138 billion between 2023-2040 under current pollution trends. (Clean Air Fund, 2023). These findings underscore the urgent need for comprehensive policy interventions and highlight the critical intersection between environmental health and economic development in rapidly urbanizing African cities.

Informal settlements in Nairobi cover approximately 5.2% of the city's total residential area, yet they are home to about 60% of the city's population (Clean Air Fund, 2023). Residents of these informal settlements rely on dirty cooking fuels, improper waste management, and are exposed to highly polluting small-scale industries, all of which contribute to poor air quality. The resulting health issues, including increased morbidity and mortality, limit residents' productivity and lead to frequent absenteeism from work. Since the informal economy is crucial to Nairobi's GDP, the health impacts of air pollution pose a significant risk on the GDP, as workers in these areas lack access to proper healthcare and are disproportionately affected by the deteriorating air quality (Clean Air Fund, 2023).

In Nairobi, 40% of movement is by public transport, while 49% of residents primarily walk, especially in informal settlements. Many residents work in informal businesses along major roads, making them highly vulnerable to health problems caused by poor air quality from vehicle emissions and dust. Conditions such as asthma and premature death are common consequences of exposure to pollution. These health issues hinder individuals' ability to work, resulting in lower income and reduced economic productivity (Vande Hey, n.d.).

2.5.2.1 Productivity Losses and Labour Market Impacts

Worker absenteeism and reduced productivity caused by pollution-induced illnesses cost Nairobi's economy \$192 million annually, a figure projected to rise as pollution levels increase (Clean Air Fund, 2023). Industries reliant on outdoor labour, such as construction and transportation, face disproportionate losses due to employee health declines thus further affecting GDP growth. Additionally, premature deaths among working-age adults reduce the labour force, exacerbating skill shortages in key sectors like manufacturing and healthcare (Clean Air Fund, 2023).

2.5.2.2 Informal Sector, Settlements and Household Energy Poverty

In Nairobi's slums, reliance on biomass fuels exposes 68% of households to indoor PM_{2.5} pollution (Dianati et al., 2019). This energy poverty traps residents in a health-economic vicious cycle: families allocate 12% of monthly income to treating respiratory conditions (Dianati et al., 2019), while lost workdays from illness reduce earnings by a further 15% (Dianati et al., 2019). Participatory modelling indicates that accelerating clean cookstove adoption could save households \$23 monthly (Dianati et al., 2019), demonstrating how pollution mitigation directly enhances disposable income. Formalization policies must balance environmental protection with livelihood preservation, as abrupt restrictions on charcoal sales or waste burning could eliminate 890,000 jobs (Dianati et al., 2019).

2.5.3 Environmental Impacts

Visibility is highly impacted and influenced by small airborne particles, called particulate matter, which scatters sunlight, hence reducing visibility. These are generated through anthropogenic causes such as vehicular emissions and other forms of transport, power plants, factories, and crop burning as well as natural causes such as forest fires, sea salt, dust, and volcanic eruptions (Singh, pope, & Avis, 2020).

Urbanization often involves clearing vegetation for buildings and road construction, reducing the ecosystem's natural purification capacity. Additionally, expanding development leads to urban sprawl and increased vehicle use, intensifying emissions of greenhouse gases, particulate matter, and sulphur dioxide. As a result, cities become significant contributors to global warming and climate change (Oyugi, 2021).

Air pollution leads to the formation of ground - level Ozone (O₃) which is a significant greenhouse gas and air pollutant, linked to premature deaths, reduced crop productivity, and global warming (Apondo, et al., 2018).

Water and air pollution in informal settlements, which lead to environmental degradation, are attributed to poorly treated sewage and uncollected garbage. An increase in vehicles contributes to gridlock and elevated greenhouse gas emissions, contributing to air pollution and acid rain. Additionally, untreated effluents and household waste often flow into rivers, contaminating water sources and making them unsafe for consumption (Cherotich & Maamun, 2022).



Water and air pollution in informal settlements, which leads to environmental degradation, is attributed to poorly treated sewage and uncollected garbage.

2.6 Performance Review of 2019-2023 Air Quality Action Plan

This section provides highlights of the performance review of the previous Nairobi Air Quality Action Plan (2019-2023) as per the stock-take report of March 2025. The objectives of the 2019-2023 Air Quality Action Plan were (i) Building scientific evidence for policy, legislative and regulatory interventions for air quality management; (ii) Raising public awareness of the health and environmental impacts of air pollution; (iii) Developing effective approaches to air quality management; and (iv) Building an effective implementation and enforcement programme for air quality legislation.

The specific actions aligned to the objectives and their respective ratings as per the employed methodology in the stock take report are summarised in Table 7.

Table 7: Performance Rating of 2019-2023 Nairobi City County Air Quality Action Plan

S/ No	Action Description	Rating
1	Build capacity of NCCG officials to monitor and report air quality data	Below average
2	Establish Nairobi City's air quality baseline through rapid assessment cutting across seasons	Not undertaken
3	Installing a network of air quality monitors in Nairobi City and in selected background locations to monitor key air pollutants of concern	Below average
4	Estimate the health and Environmental/climate change impacts of Nairobi City's air pollution and likely future trends	Below average
5	Develop and implement a communications strategy for disseminating air quality information to decision makers and the public in Nairobi City	Successful
6	Develop and implement a public participation strategy for air quality management in Nairobi City	Not undertaken
7	Develop the Air Quality Policy for Nairobi City	Successful
8	Develop Air Quality Legislation for Nairobi City	Successful
9	Develop the Implementation Strategy for the Nairobi City Air Quality Legislation	Not undertaken
10	Set up an air quality unit within the NCCG	Successful
11	Develop a training manual/toolkit/handbook for implementation and enforcement of air quality legislation	Not undertaken
12	Train enforcement officers on air quality enforcement	Not Undertaken
13	Develop and implement an incentive-based compliance promotion programme among the regulated community	Not undertaken
14	Monitor compliance & enforce air quality requirements	Below average
15	Evaluate performance of the Action Plan, remediate and/or reinforce as necessary, building into the next Action Plan	Average
Overall Performance		Average

2.6.1 Achievements



- Installation of two air quality, reference monitors at Mama Lucy Hospital and the Nairobi Fire Station, and 50 low cost sensors city wide. (NCCG, 2024d)
- Training of 0.5% of staff establishments in the Environmental Department on air quality management (NCCG, 2024e)
- Established partnerships to increase air quality awareness among residents of Nairobi City. (NCCG, 2024f)
- Developed an air quality policy for the Nairobi City County.
- Developed the Air Quality Act, 2022 for Nairobi City County.
- Established Air Quality Management Unit within Nairobi City County governance structures and recruitment of staff.
- Incorporated air quality management actions in the Nairobi City County Integrated Development Plan (2023-2027).

2.6.2 Challenges



- **Inadequate funding:** Whereas the CIDP 2023 – 2027 has allocated Ksh. 1 billion to address air quality management and climate related issues, the allocation was made at the end of the implementation of the action plan (NCCG, 2023c). Furthermore, the budget cuts from the national treasury and donors have caused strains, leading to limited skills enhancement through capacity building for environmental officers, procuring air quality monitoring equipment and other planned actions requiring funds.
- **Sustainability of Air Quality Monitoring:** Whereas partners have supported the city in acquisition of two regulatory monitors, it is evident that the knowledge and skill transfer on air quality measurement and monitoring is not effective, since the city environmental officers, who are the implementers of the Air Quality Action Plan are not meaningfully involved in maintenance, data collection, and analysis. Currently, the city officers have no access to the two sites-meaning they are losing opportunity for apprenticeship.
- **Inadequate capacity to monitor and report on air quality data.** Most city environmental officers lack the knowledge and skill of monitoring and reporting on air quality data. This gap needs to be addressed innovatively in the next planning cycle.
- **Lack of set targets for air pollution reduction per priority sector:** This leads to untargeted actions which are not effective, efficient and more often than not non-implementable.
- **Misaligned air quality objectives to sectoral plans:** This enhances ineffectiveness and inefficiency in the implementation of planning actions which could otherwise be leveraged through other sectoral plans.
- **Lack monitoring & evaluation framework for Air Quality Action Plan:** There is need for an inbuilt mechanism within County processes to ensure internal monitoring of the implementation of the Air Quality Action plan for corrective measures and enhance efficiency.
- **Inadequate involvement of public in formulation of Plan.** This led to low awareness on the plan and its provisions.

2.6.3 Recommendations



- **Need to establish the City's air quality baseline through rapid assessment cutting across seasons:** This exercise informs the plan resulting to proposed actions that are implementable and targeted hence ensuring efficient and effective utilization of resources available to implement the Air Quality Action Plan.
- **Need to install more City owned air quality monitors and its information management system for reporting on air quality within the city:** This will enable the city to take evidence - backed actions for betterment of the air quality and general healthy environment for Nairobians.
- **Need to develop and implement a public participation strategy for air quality management in the City:** This will ensure that the formulation of air quality action plan is more inclusive resulting to enhanced public awareness on air quality management and voluntary compliance through innovative local solutions.
- **Develop a training manual/toolkit/handbook for implementation and enforcement of air quality legislation:** This will result to harmonized implementation and enforcement thus achieving the goal and objectives of clean air action planning.
- **Train enforcement officers on air quality enforcement:** This will ensure effective enforcement of air quality standards and enhance compliance. Thus ensuring a clean and healthy environment.
- **Develop and implement an incentive-based compliance promotion programme among the regulated community:** This will enhance compliance and ensure sustainability.
- **Develop the Implementation Strategy for the Nairobi City Air Quality Legislation:** For consistency and coherence in formulation of legislation, and enhance coordination by avoiding duplication, overlaps and omissions.

2.6.4 Lessons Learnt



- Partnerships are key in ensuring successful implementation of the Air Quality Action Plan.
- Formation of city - wide air quality working group that brings on board all stakeholders and community ensures successful implementation of the Air Quality Action Plan.
- Mapping stakeholder interest and influence/power is an important aspect in formulating an engagement framework for the operation of an air quality working group network.
- Community involvement in formulation and implementation of an air quality action plan enhances awareness and provides opportunity to tap into local solutions for managing air quality within a community or the city.
- Integrated planning enhances successful implementation of an Air Quality Action Plan. However, the difference between budgeted sum and disbursements inhibit implementation of the plan.
- Preparation of Air Quality Action Plan before the preparation of an integrated plan provides the opportunity to incorporate the air quality management objectives and actions in the CIDP.

CHAPTER

03:

DEVELOPMENT AND IMPLEMENTATION OF THE NAIROBI CITY COUNTY AIR QUALITY ACTION PLAN 2025-2029

3.1 Policy & Legal Context

The preparation of this Air Quality Action Plan is founded upon both national and county policies and legislations as highlighted below.



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3.1.1 The Constitution of Kenya, 2010

Article 10 of Kenya's Constitution adopts the principle of sustainable development as one of the national values and principles of governance. Article 42 of the Constitution guarantees every person in Kenya the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of the present and future generations through legislative and other measures. The Constitution also places a duty upon all persons in Kenya to cooperate with the State in safeguarding and enhancing the environment. Various obligations are also placed upon the State under Article 69 with respect to the environment, including, among others, to ensure the sustainable use, management and conservation of the environment and natural resources, and to eliminate processes and activities that are likely to endanger the environment. All these provisions and safeguards in the Constitution have a direct bearing on air quality management and climate change responses in the country.

Article 6 of the Constitution divides the territory of Kenya into 47 counties and states that the governments at the national and county levels are distinct and inter-dependent and shall conduct their mutual relations on the basis of consultation and cooperation. A broad interpretation of various Constitutional provisions reveals that air quality management is a concurrent function between the national and county governments. Article 186 outlines that the powers and functions of the national and county governments shall be as provided in the Fourth Schedule. The functions and power of county governments as provided in the Fourth Schedule include control of air pollution, noise pollution and other public nuisances. Under Article 185 of the Constitution, legislative mandate is bestowed upon the County Assembly legal mandate to make laws addressing issues of air pollution within its jurisdiction.

3.1.2 National Environment Policy, 2013

The National Environment Policy establishes an overarching guiding framework for an integrated approach to environmental protection and sustainable management of Kenya's natural resources. On air quality and climate change, the policy outlines the government's commitment to deliver the following actions: ensure compliance with air quality standards and strengthen enforcement capacity; promote efficient non-motorized, non-polluting and efficient infrastructure for mass transport system; promote non-polluting modes of transport; promote alternative cooking stoves and technologies that are non-polluting and construction of well-ventilated houses; develop and implement a comprehensive National Climate Change Policy; strengthen capacity for national and county level institutions to support national climate resilience and low carbon development; develop and implement awareness raising strategies and capacity development on the opportunities for adaptation and mitigation measures; strengthen and enhance early warning and response systems for climate and disaster risk reduction; build and strengthen research capacity on climate change and related environmental issues; put in place a climate financing mechanism; establish a national carbon trading platform and renewable energy trading certification system; involve and empower communities in mitigating and adapting to climate change.

3.1.3 Environmental Management and Coordination Act (Cap.387)

This is Kenya's framework law on all matters pertaining to the environment. The Act re-affirms the Constitutional guarantees relating to the right to a clean and healthy environment and the duty of all persons to safeguard and enhance the environment. On air quality and climate change, the Cabinet Secretary responsible for environmental affairs is granted various powers by the Act, including powers to: set ambient air quality standards, occupational air quality standards, emission standards for various sources, criteria and guidelines for air pollution control for both mobile and stationary sources; and any other air quality standards; determine measures necessary to reduce existing sources of air pollution; issue guidelines to minimize emissions of greenhouse gases and identify suitable technologies to minimize air pollution.

The Act also gives mandate under section 29 and 30 to the counties to form the County Environment Committees, responsible for proper management of the environment matters within the county they operate in. The County Environment Committee is also mandated to develop a county strategic environmental action plan every five years. Section 78 of the Act empowers the Cabinet Secretary, on the recommendation of the National Environment Management Authority, and in consultation with lead agencies including county governments, to establish emission measurement procedures, prescribe ambient, occupational and emission standards and recommend measures for air quality management. To provide an operating framework, section 147A of the Act empowers the counties to make relevant environmental legislation as permitted by the Constitution or this Act.

3.1.4 Environmental Management and Coordination (Air Quality) Regulations, 2024

These regulations are intended at operationalizing the general air quality provisions of the Environmental Management and Co-ordination Act as relates to ambient air. The regulations have several prohibitions relating to both mobile and stationary sources of air pollution, and sets limits that must not be exceeded.

3.1.5 Climate Change Act, 2016

Kenya's Climate Change Act provides the legal framework for promoting climate resilient low carbon economic development. The objectives of the Act include, among others, to mainstream climate change responses into development planning, decision making and implementation; build resilience and enhance adaptive capacity to the impacts of climate change; promote low carbon technologies to improve efficiency and reduce emissions intensity by facilitating approaches and uptake of technologies that support low carbon, and climate resilient development; facilitate capacity development for public participation in climate change responses through awareness creation, consultation, representation and access to information; integrate climate change into the exercise of power and functions of all levels of governance, and to enhance cooperative climate change governance between national government and county governments. The Climate Change Act, 2016 gives the county governments the mandate to develop their climate action plans and to integrate climate change actions into their development planning and budgeting.

3.1.6 The County Governments Act, 2012 and the 2023 Amendment

The functions of the county government are outlined in section 5 of this Act, giving effect to articles 185-187 and the 4th Schedule part 2(3) of the Constitution in relation to air quality management. From this, the county is able to formulate relevant action plans.

3.1.7 The Urban Areas and Cities Act, 2011 and the 2019 Amendment

Considerations of designating the county as an urban area are provided for in section 4 and 5 and as a capital city under section 6, part 1 of this Act. These are satisfied with reference to Chapter 1 of this report on Nairobi's contextual background. Considering the aspects in Chapter 1, the citizens are given fora in section 22 to deliberate and make proposals on proposed issues for inclusion in county policies and county legislation. The city's management structure in line with section 27 is in the same manner as a county government and shall operate within the framework of integrated development planning as outlined in section 36 to 38.

3.1.8 The Nairobi City County Public Participation Act, 2015

The objective of this Act under section 2(d, g and h) is to provide a framework for public participation, effect the county governments Act, 2012 and to hold the county government accountable for service delivery. Section 7(1 and 2) respectively, give the relevant mechanisms to be adopted for public participation and take account of language preference, persons living with disabilities and communication mediums. This guides the general process of formulation of county policies & plans.

3.1.9 Nairobi City County Solid Waste Management Act, 2015

The Nairobi City County Solid Waste Management Act, 2015 creates a legal framework for sustainable management of solid waste in the county in furtherance of the county's waste management function as outlined in the Fourth Schedule of the Kenya Constitution.

3.1.10 The Nairobi City County Non-Motorized Transport Policy, 2015

The Policy aims to integrate walking, cycling, and other non-motorized modes into the city's transportation system, recognizing their importance for mobility, health, and environmental sustainability. The policy includes a commitment to improve walking and cycling infrastructure, as well as to enhance safety and create a more equitable transportation environment.

3.1.11 The Nairobi City County Transport Act, 2020

This Act provides the legal framework for the administration of transport within the county. One of the major highlights of the Act is the Capital City Transport Plan that is required to be developed every five years to align with the content and timing of the CIDP. The Plan is intended to provide for, among others, an integrated framework for all transport modes as well as policies and programmes for the development of public transport and mass transit, and associated legal reform over the period in question. To manage the county's emissions and air pollution, the Act aims to ensure promotion of non-motorised transport and the designation of low emissions zones in any area of the county.

3.1.12 The Nairobi City County Air Quality Policy, 2020

This policy provides a strategic guideline of addressing air quality management in the city.

3.1.13 The Nairobi City County Air Quality Act, 2022

The Nairobi City County Air Quality Act, 2022 provides the legislative framework for management of air pollution in the county for protection of public health and the environment. The Act lays down provisions for control of air pollution from both stationery and mobile sources.

3.1.14 Nairobi City County Climate Action Plan 2020-2050

This Action Plan aims to achieve carbon neutrality in Nairobi City County by 2050, with a conditional target of a 24% reduction below business-as-usual emissions by 2025 and a 51% reduction by 2035. The plan focuses on integrating climate change considerations into all areas of governance and development, addressing it as a cross-cutting issue. It also aims to ensure that Nairobi contributes to both national greenhouse gas reduction targets and climate change adaptation goals.

3.1.15 Nairobi City County Climate Change Act, 2024

The Nairobi City County Climate Change Act, 2024 establishes the legal framework for enhanced county climate change mitigation strategies and adaptation programmes. It seeks to align county climate action with national obligations through the establishment of structures and systems for climate change mitigation, adaptation and financing. Specifically, the Act provides a framework for (i) mainstreaming of climate change across sectors, (ii) coordinating financing of climate change adaptation and mitigation projects at the community levels, (iii) facilitating community-initiated climate change mitigation and adaptation projects, and (iv) coordinating collection and dissemination of climate change information to the public to create awareness and preparedness.

3.1.16 County Integrated Development Plan (2023-2027)

The Nairobi City County Integrated Development plan 2023-2027 has incorporated air quality management action. For instance, the CIDP acknowledges that Increased air pollution from rapid industrialization constantly reduces the air quality and threatens future use of this resource. It recognizes constant tracking of pollution and proper remedial interventions as opportunity for optimal utilization and highlights low adoption of green energy as a constraint and stakeholder collaboration as existing sustainable management strategy.

To meet its Aspiration II: A city of dignity, the county through the CIDP targets clean environment for all city dwellers which includes improved air quality. The CIDP prioritizes protection of Nairobians from environmental pollution by mapping out air pollution in the city prone areas and install air quality monitoring equipment among other strategies. Under sector sub-programs in Environmental Management and Protection Programme the CIDP has outlined increased air quality monitoring as a key output and number of air quality sampling kit procured as respective indicator. It has also outlined establishment and maintenance of city-wide air quality monitoring and management network as a performance indicator for increasing climate resilience output with a total budget of 1 billion for the five-year term implementation. This action plan, whereas ambitious, should align to the CIDP provisions.

3.2 Consultations and Stakeholder Engagement

The development of Nairobi City County Air Quality Action Plan 2025-2029 was a collaborative effort between the County Government and partners. The process was financially supported by Clean Air Fund through Breathe Cities initiative and technical support provided by Environmental Compliance Institute.

The process involved stock-take of the previous plan, documenting best practices and undertaking a participatory development of Air Quality Action Plan. To ensure meaningful participation of stakeholders, stakeholder mapping was undertaken through power-interest matrix to determine participants in the technical write-shop that formulated the zero drafts. A series of 3 stakeholder workshops were convened to review the drafts and ensure that comments and suggestions from stakeholders are incorporated in the plan. A County Leadership briefing session was also convened to provide further input to the action plan which have been incorporated in this finalized air quality action plan.

3.3 Other Relevant Laws and Policies

Other relevant laws and policies that inform formulation and implementation of the air quality action plan include:

1. Physical Planning and Land Use Act CAP.303
2. Nairobi Integrated Urban Development Plan (2015-2030)
3. Nairobi City County Public Participation Act, 2015
4. Nairobi City County Building Code 2024
5. Nairobi City County Regulation on Unauthorized Development Act, 2025
6. Nairobi City County Public Nuisance Act, 2021

3.4 Vision and Mission for the Air Quality Action Plan

Mission:

To improve air quality in Nairobi through inclusive, sustainable and resilient practices for a healthy city.

Vision:

A Nairobi with clean and healthy air for all.



3.5 Goals for the Air Quality Action Plan

The Goals are:

- 1.** To develop emission reduction targets for at least five priority sectors in the City County.

- 2.** To reduce emissions of harmful air pollutants by supporting sectoral programmes that contribute to clean air and climate change mitigation.

- 3.** To enhance public education and awareness on air quality management in the City County.

- 4.** To enhance compliance and enforcement of air quality standards in the City County.

3.6 Specific Objectives of the Air Quality Action Plan

In order to attain the established goals specific objectives are outlined for each goal as follows;



GOAL 1

To develop emission reduction targets for at least five priority sectors.

Objective 1.1 Develop emission reduction targets for transport, waste management, construction, industry and urban agriculture.



GOAL 2

To reduce emissions of harmful air pollutants by supporting sectoral programmes that contribute to clean air and climate change mitigation.

Objective 2.1: Reduce and control emissions from vehicles in the city.

Objective 2.2: To support sustainable transport planning initiatives.

Objective 2.3: Reduce and control emissions from waste management in the city.

Objective 2.4: Fairly Improve air quality in densely populated low-income settlements.

Objective 2.5: Support National and County Government programmes targeting reduction of GHG emissions.

Objective 2.6: Reduce and control emissions from urban agriculture.



GOAL 3

To enhance public education and awareness on air quality management.

Objective 3.1: To build upon existing education and awareness activities and provide a comprehensive and sustainable awareness and communication programme for air quality management.

Objective 3.2: To support research efforts to determine extent of health effect of poor air quality on population of Nairobi City.



GOAL 4

Enhance compliance and enforcement of air quality standards within the City County.

Objective 4.1: To monitor criteria air pollutants which present a threat to health, well-being or the environment.

Objective 4.2: To strengthen capacity of the Nairobi City County in air quality management, compliance and enforcement.

Objective 4.3: To enforce the current and future regulations on air quality management.

Objective 4.4: To support Nairobi City County departments and facilities in maintaining environmental compliance.

Objective 4.5: To conduct annual compliance and air quality monitoring on listed facilities within the city County.

Objective 4.6 To involve the city communities in informing planning and implementation of air quality programmes.

3.7 The Implementation Matrix

The proposed actions to achieve the stated goals are presented in the implementation matrix in table 8.



GOAL 1:

To Develop emission reduction targets for at least five priority sectors.

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Objective 1.1: Develop emission reduction targets for transport, waste management, construction, industry and urban agriculture.						
Establish an inclusive air quality monitoring infrastructure.	<p>NCCG Department of Environment & Climate Change.</p> <p>Public Health Department.</p> <p>NCCG ICT department.</p> <p>NCCG Communication and Public Relation Department.</p> <p>Nairobi City County air pollution control committee.</p>	<p>Number of air quality sensors established.</p> <p>Operation of air quality data management and reporting system.</p> <p>Involvement of community in setting up air quality monitoring infrastructure.</p>	<p>Report on number, location and operation status of NCCG's air quality sensors deployed in the City.</p> <p>Real time air quality Data available and accessible to the public on NCCG's website.</p> <p>Report on operation status of all NCCG deployed air quality sensors.</p> <p>Reports, blogs and evidence from NCCG's website indicating number and nature of involvement of local community in setting up air quality monitoring infrastructure in the county.</p> <p>Report on the distributions of the air sensor among the community members.</p>	Year 1-5	High	<p>NCCG budget</p> <p>Bilateral partners</p> <p>Academia and research institutions</p>
Undertake baseline studies on air quality and Health.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Public health Department. NCCG Policy and Research Department. Research Institutions and Universities. Nairobi City County air pollution control committee. 	Undertaken baseline studies on air quality in the city.	Report on baseline studies.	Year 1	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners Academia and research institutions

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Undertake Source apportionment studies and air quality surveys.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change . • NCCG (Policy and Research). • Department. • Urban Policy and research department. • NCCG. • Department of Health. • NCCG Department of Mobility and Works. • Nairobi City County air pollution control committee. 	Identified and quantified sources contributing to air pollution in the city.	Report on source apportionment studies.	Year 1-5	High	<ul style="list-style-type: none"> • NCCG Budget • Bilateral partners • Ministry of Environment • NEMA • Research institutions and Academia
Setting sector pollution reduction targets.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • NCCG Department of Mobility and Works. • NCCG Department of public Health. • NCCG Department of Market and Trade. • Food and Agriculture Department. • Nairobi City County air pollution control committee. • NEMA. 	Set pollution reduction targets for Transport, waste management, construction, industry and urban agriculture sectors.	Report on set pollution targets for transport, waste management, Construction, industry and urban agriculture sectors.	Year 3-4	High	NCCG budget



GOAL 2:

To reduce emissions of harmful air pollutants by supporting sectoral programmes that contribute to clean air and climate change mitigation.

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Objective 2.1: Reduce and control emissions from vehicles in the city.						
Integrate vehicle emission sub-working group within the larger Nairobi Air Quality Working Group.	<ul style="list-style-type: none"> NCCG Mobility and Works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NAMATA. 	<ul style="list-style-type: none"> Number of members and composition of the sub-working group. Number of sub-working group meetings. Establishment of vehicle-emission sub-working group. 	Report on establishment of vehicle emission sub-working group.	Year 1	High	<ul style="list-style-type: none"> NCCG budget Bilateral partnerships Grants NTSA NAPTA NEMA KAM
Collaborate with national government in establishing emission testing and enforcement of mobile pollution sources.	<ul style="list-style-type: none"> NCCG Mobility and Works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NEMA. NTSA. 	Number of collaborative initiatives.	<ul style="list-style-type: none"> Report on collaborative initiatives on establishment of emission testing and enforcement of mobile pollution sources. 	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners NEMA budget NTSA budget Grants
Collaborate with national government in implementing strict penalties for non-compliant vehicles.	<ul style="list-style-type: none"> NCCG Mobility and works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NEMA. National Police Service. 	Number of non-compliant vehicles penalized in Nairobi County.	<ul style="list-style-type: none"> Report on compliance with vehicle emission standards within Nairobi City County. 	Year 2-5	High	<ul style="list-style-type: none"> Bilateral partners NCCG budget NEMA budget NTSA budget Grants

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Participate in and collaborate in and support other forums and organisations undertaking initiatives that relate to vehicle emission reductions in order to share lessons learned and transfer knowledge.	<ul style="list-style-type: none"> NCCG Mobility and Works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	<ul style="list-style-type: none"> Number and nature of the relevant forums attended. Number of collaborative agreements signed and operational. 	<ul style="list-style-type: none"> Reports on convening's and forums on vehicle emission reduction. Reports on collaborative agreements established. 	Year 1-5	Moderate	<ul style="list-style-type: none"> Multilateral partnerships Bilateral partnerships Grants
Develop policy to reduce vehicle emissions within the City County.	<ul style="list-style-type: none"> NCCG Mobility and Works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Policy and Research Department. NCCG Office of county attorney. 	Number and nature of the policy established.	Policy on vehicle emission reduction on NCCG website.	Year 2-3	High	<ul style="list-style-type: none"> NCCG Budget Bilateral partners Grants
Promote use of predictive air quality modelling tools to inform land use and transport planning and ensure better alignment between Transport and air quality management.	<ul style="list-style-type: none"> NCCG Built environment and Urban planning Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Mobility and Works Department. 	<ul style="list-style-type: none"> Number of transport and land use planning reports on integrating air quality management in transport planning. 	Reports on integrating air quality management in urban transport planning.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Undertake communication and behaviour change campaigns to promote driving practices that contribute to reduction in vehicular emissions among public transport drivers in the City County.	<ul style="list-style-type: none"> NCCG Mobility and Works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Department of public communication. 	<ul style="list-style-type: none"> Number and nature of campaigns undertaken. Number of awareness forums. 	Report on campaigns to promote sustainable driving practices among private and public transport drivers in the City County.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Bilateral partner Multilateral Partners NTSA NAPTA FLONE Matatu Owners Association
Support research that encourage best practice with regards to vehicle emission reduction interventions.	<ul style="list-style-type: none"> NCCG Built environment and Urban planning Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Department of Policy research. 	Number of research projects on vehicle emission reduction supported and approved by the NCCG.	Report on research.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Academia and Research institutions Bilateral partners

Objective 2.2: To support sustainable transport planning initiatives

Construct and rehabilitate NMT infrastructure to enhance use of NMT.	<ul style="list-style-type: none"> NCCG Mobility and Works Department. NCCG Built Environment and Urban Planning Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. KURA. KeNHA . 	<ul style="list-style-type: none"> Kilometres of NMT network constructed. Numbers and nature of NMT infrastructure. % of commuters utilizing the NMT infrastructure. 	Report on construction and rehabilitation of NMT infrastructure.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Grants KeNHA budget Bilateral partners
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ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Collaborate with relevant government ministries, departments and Agencies in establishing Bus Rapid Transport System and support formalization of the paratransit sub-sector.	<ul style="list-style-type: none"> • NCCG Mobility and Works Department. • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • KURA. • KeNHA. • NAMATA. 	<ul style="list-style-type: none"> • Kilometres of network constructed. • Number of bus rapid vehicles operating in the system. • % of commuters using bus rapid transport. 	<ul style="list-style-type: none"> • Report on collaboration and participation in establishing Bus Rapid Transport System. 	Year 1-5	High	<ul style="list-style-type: none"> • NCCG budget • Bilateral Partnerships • Grants • KeNHA budget • KURA budget
Support measures aimed at the widespread adoption of Electric Vehicles roll out such as supportive charging station infrastructure installation.	<ul style="list-style-type: none"> • NCCG Built environment and Urban planning Department • NCCG Department of Environment and Climate Change • Nairobi City County air pollution control committee • NCCG Mobility and Works Department • Kenya Power 	<ul style="list-style-type: none"> • Number of approved installation of Electric Vehicles supportive infrastructure. 	<ul style="list-style-type: none"> • Report on installation of Electric vehicle supportive infrastructure in Nairobi City County. 	Continuous	High	<ul style="list-style-type: none"> • NCCG budget • Grants • Bilateral partners
Pave pedestrian walkways and regular road maintenance to reduce dust.	<ul style="list-style-type: none"> • NCCG Mobility and Works Department. • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • KeNHA. • KURA. 	<ul style="list-style-type: none"> • Kilometre of paved pedestrian walk ways and maintained roads. 	<ul style="list-style-type: none"> • Reports on road maintenance and paving of walkways. 	Continuous	High	<ul style="list-style-type: none"> • NCCG budget • KeNHA • KURA • PPP

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Establish Low Emission Zones in the city.	<ul style="list-style-type: none"> NCCG Built Environment and Urban planning Department. NCCG Mobility and Works Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	<ul style="list-style-type: none"> Number of low emission zones Areas established. 	<ul style="list-style-type: none"> Report on establishment of Low emission zones Areas. 	Year 1-5	Moderate	<ul style="list-style-type: none"> NCCG budget Bilateral Partnerships Grant

Objective 2.3: Reduce and control emissions from waste management

Formulate and implement emissions management plan for Dandora Dumpsite and solid waste transfer stations.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Built Environment and Urban Planning Department. 	A developed emission management plan.	Report on development of emission plan.	Year 2-5	Moderate	<ul style="list-style-type: none"> NCCG budget Grant Bilateral Partners Academia and Research Institutions
Implement enforcement measures to prevent illegal dumping.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Inspectorate Department. NEMA. 	<ul style="list-style-type: none"> Number of persons prosecuted. Number of incidents reported. 	Report on illegal dumping in the city.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Promote segregation of waste at source.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Department of Markets. NCCG Public Health Department. NCCG Sub-county administration. Kenya Association of Manufacturers. KEPSA. PROs. KARA. NEMA. 	<ul style="list-style-type: none"> Number and nature of campaigns in waste segregation at source. 	Report on waste segregation at source.	Continuous	Moderate	<ul style="list-style-type: none"> NCCG budget Multilateral Partnerships Bilateral partners
Encourage public-private partnerships to support innovative waste management solutions.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change . Nairobi City County air pollution control committee. 	Number of active partnerships on innovative waste management solution.	Reports on active partnerships supporting innovative waste management solutions posted on NCCG website.	Continuous	Moderate	<ul style="list-style-type: none"> Multilateral Partnerships Bilateral partners
Designate specific waste incineration/ microwave facilities installed with conforming emission control technologies.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Built Environment and Urban planning Department. NCCG Public Health Department. NEMA. 	<ul style="list-style-type: none"> Number of designated incinerators/ microwave installed with conforming emission control technologies. 	Report on designated incineration/ microwave facilities installed with conforming emission control technologies posted on NCCG and NEMA website.	Continuous	Moderate	<ul style="list-style-type: none"> NCCG budget NEMA Bilateral partners

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Ban open burning of waste.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	Number of reported incidents on open burning.	Report on open burning of waste at household level.	Year 1-2	High	<ul style="list-style-type: none"> NCCG budget NEMA
Provide fiscal incentive for waste collection companies that have adopted sustainable waste management practices.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Finance Department. NEMA. 	<ul style="list-style-type: none"> Number and nature of fiscal incentives provided. 	Policy document on the fiscal incentive.	Year 2	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners Grant
Manage odorous hydrogen sulphide and other emissions generated by waste water/ sewage treatment process to below nuisance levels for adjacent communities.	<ul style="list-style-type: none"> Nairobi Water and Sewerage Company. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	Reported incidents of nuisance.	Record of reported incidents.	Continuous	Moderate	<ul style="list-style-type: none"> NCCG budget
Manage and maintain sewerage pump stations and distribution infrastructure to prevent the emission of odorous to the atmosphere to below nuisance levels.	<ul style="list-style-type: none"> NWSC. NCCG Water and Sanitation Department. 	<ul style="list-style-type: none"> Maintenance Schedule. Reported incidents of nuisance. 	<p>Sewerage maintenance report.</p> <p>Incident report on nuisance from sewerage.</p>	Y1-Y5	Moderate	<ul style="list-style-type: none"> NCCG budget

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
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Objective 2.4: Fairly Improve air quality in densely populated low-income settlements

Designate a dedicated Health & environment officers to champion air quality improvement projects in dense low-income settlements.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Department of public Health. 	Number of officers appointed for each dense low-income settlement.	Report on appointment/designation.	Year 1	High	NCCG budget
Undertake social and economic uplifting projects that address identified sources of air pollution in dense low-income settlement.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Built environment and Urban planning Department. Public health department. NCCG Mobility and Works Department. Gender and Inclusivity Department. NCCG Public engagement and customer service Department. 	<ul style="list-style-type: none"> Number of projects that address sources of air pollution in dense low-income settlement. Air quality measurements. 	<ul style="list-style-type: none"> Report on projects implemented in dense low-income settlement. Report on air quality measurements. 	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Support and ensure that constructed affordable housing units or other units are designed and constructed in accordance with energy efficiency guidelines and has adequate aeration.	<ul style="list-style-type: none"> • NCCG Built environment and Urban planning Department. • DOSH. • NCCG public Health Department. • NCCG Gender Inclusivity Department. 	<ul style="list-style-type: none"> • Number of units inspected and approved by Authorities. 	<ul style="list-style-type: none"> • Report on energy efficiency (audits) from as built design of the housing units. 	Continuous	High	<ul style="list-style-type: none"> • NCCG budget • Bilateral Partners • NEMA • National department of housing and urban development
Collaborate with government ministries, departments and agencies, in integrating, air quality management considerations in sanitation infrastructure and service improvement projects/ programmes in dense low income areas.	<ul style="list-style-type: none"> • NCCG Built environment & Urban planning Department. • NCCG Public Health Department. • NEMA. • Nairobi Water and Sewerage Company. 	<ul style="list-style-type: none"> • Number of sanitation infrastructure projects/ programmes that have integrated air quality management consideration. 	Reports on integration of air quality management considerations in project/ programme.	Continuous	High	<ul style="list-style-type: none"> • NCCG budget • Bilateral Partnerships • NEMA • National department of housing and urban development
Engage with relevant political and apolitical stakeholders to support air pollution reduction interventions in dense low-income settlement.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Public Health Department. • Public engagement Department. 	Number of air pollution interventions in informal settlements from engagement with political and apolitical stakeholders.	Report on successful stakeholder engagements.	Year 1-5	High	<ul style="list-style-type: none"> • Bilateral partnerships • NCCG budget • NCGF

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING & EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
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Objective 2.5: Support National and County Government programmes targeting reduction of GHG emissions

Facilitate procurement process that has lower energy consumption with reduced impact on GHG emission.	NCCG. Finance Department. NCCG procurement Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee.	Number of energy efficient climate friendly goods and services procured.	Report on energy efficient and climate friendly goods and services procured by the county.	Continuous	High	• NCCG budget
Accelerate adoption of clean technologies and practices within the City.	• NCCG Built Environment Department. • NCCG Public Health Department. • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Mobility and Works Department. • NCCG public engagement Department. • Market and Trade Department.	Survey on adoption of clean technologies and practices.	Survey reports.	Continuous	Moderate	• NCCG budget • Academia and Research institutions

Objective 2.6: Reduce and control emissions from urban agriculture

Facilitate adoption of sustainable farming practices.	NCCG food, Agriculture and Natural resource Department.	% of farmers trained. % of famers practising sustainable farming.	Reports on adoption of sustainable urban agriculture.	Yearly	Moderate	• NCCG budget • Bilateral Partners • Academia and Research institutions
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GOAL 3:

To enhance public education and awareness on air quality management

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Objective 3.1: To build upon existing education and awareness activities for air quality management						
Establish an education and awareness component within the county to implement programmes.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Health Department. NCCG public engagement Department. 	Reviewed organogram in Air quality and Climate Change Unit indicating education and awareness component officer.	Report on establishment of education and awareness component within air quality and climate change unit of NCCG.	Year 1	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners Grants
Increase existing air quality education and awareness programmes in Early Childhood and primary schools.	<ul style="list-style-type: none"> NCCG Wellness, Nutrition and school feeding Department. NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Public Health Department. NCCG Department of Education. 	Number of air quality education and awareness programmes.	Report on air quality education and awareness programme.	Year 1-2	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners Grants

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Support programmes on best practices and reduction at source activities in air quality management by developing education material for industry.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Built Environment and planning Department. Markets and Trade Department. Public Health Department. NCCG public engagement Department. 	<ul style="list-style-type: none"> Number of programmes on best practices and reduction at source activities. Number of industry personnel trained. 	<ul style="list-style-type: none"> Developed programme on best practices and reduction at source activities. Training reports. 	Year 1-5	Moderate	<ul style="list-style-type: none"> NCCG budget Multilateral Partnerships Bilateral partners Grants

Objective 3.2: To support research efforts to determine extent of health effect of poor air quality on population of Nairobi City

Support and collaborate in academic research initiatives with respect to health effects and climate change aspects linked to air pollution through the provision of the City air quality monitoring and emissions data.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG public Health Department. NCCG Policy and Research Department. Universities and Research institutions. 	<ul style="list-style-type: none"> Number of academic research initiatives supported and approved by the County. Number of research collaborations. 	<ul style="list-style-type: none"> Report on academic research initiatives supported and approved by NCCG. Report on research collaborations. 	Year 1-5	Moderate	<ul style="list-style-type: none"> NCCG Budget National Research Fund Academia and Research Institutions Grants
Support Health Risk assessment studies.	<ul style="list-style-type: none"> NCCG Public Health Department Ministry of Health. Research Institution. DOSH. 	Invitations and participation acknowledgements.	Reports on Health risk assessment studies.	Year 2-4	High	<ul style="list-style-type: none"> NCCG Budget Bilateral partnerships Grants



GOAL 4:

Enhance compliance and enforcement of air quality standards within the City County

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Objective 4.1: To monitor criteria air pollutants which present a threat to health, well-being or the environment						
Maintain and expand air quality monitoring network to measure priority pollutants.	NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. ICT Department. Mobility and Works Sector.	Number of priority air quality monitors added.	Report on air quality equipment and status of the network.	Year 1-5	High	<ul style="list-style-type: none"> • NCCG budget • Bilateral partners • Grants
Develop activities to monitor, manage and reduce atmospheric emissions from Dandora dumpsite.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • Policy and Research Department. • Department of Public Health. • Academia and Research institutions. 	Number of emission monitoring activities.	Report on emissions from Dandora dumpsite.	Year 2-5	Moderate	<ul style="list-style-type: none"> • NCCG budget • Grants • Bilateral partners
Continuous monitoring, analysis and reporting air quality.	NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. ICT Department. Communication Department. Department of Public Health. NCCG Transport Department.	Continuous data on air quality within Nairobi.	Report on air quality monitoring.	Year 1-5	High	<ul style="list-style-type: none"> • NCCG budget • Grants • Bilateral partners

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Monitor the health outcomes secondary to air pollution.	<ul style="list-style-type: none"> NCCG. Public Health Department NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	Data on health outcomes & air Quality.	<ul style="list-style-type: none"> County Epidemiological reports. Weekly surveillance report. 	Year 2-5	Moderate	<ul style="list-style-type: none"> NCCG budget Ministry of Health Grants

Objective 4.2: To strengthen capacity of the Nairobi City County in air quality management, compliance and enforcement

Enhance capacity of County environmental officers by training and gazettement air quality Inspectors.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NEMA. 	Number of environmental officers trained.	Training report.	Year1	High	<ul style="list-style-type: none"> NCCG budget Bilateral partners Grant
Gazetting of Nairobi City County Air Pollution Control committee.	<ul style="list-style-type: none"> CECM Green Nairobi. 	Gazetted committee.	Documentation of relevant Kenya gazette issue.	Year 1	High	<ul style="list-style-type: none"> NCCG Budget
Gazetting of air quality inspectors.	<ul style="list-style-type: none"> CECM Green Nairobi. 	Number of Gazetted air quality inspectors.	Documentation on gazetted air quality inspectors.	Year 1	High	<ul style="list-style-type: none"> NCCG Budget
Establish guidelines on reduction of odours.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	Published guidelines on reduction of odour.	Documentation of Published guidelines on reduction of odours.	Year 1	High	<ul style="list-style-type: none"> NCCG Budget
Enhance capacity of staff in the climate change and air quality on maintenance of Air quality instruments.	<ul style="list-style-type: none"> NCCG Climate change and air quality Unit. 	Number of trained staff.	Training report.	Year 1-2	High	<ul style="list-style-type: none"> NCCG budget Bilateral partner Grant

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Train county air quality inspectors on strategies for achieving compliance.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	Number of trained air quality inspectors.	Training Report.	Year 1-5	High	<ul style="list-style-type: none"> NCCG Budget Bilateral partners
Establish air quality compliance reporting system.	<ul style="list-style-type: none"> NCCG Environment and Climate Change. Department of public health Nairobi City County air pollution control committee. 	<ul style="list-style-type: none"> % of emission reduced. Number of facilities reporting. 	Quarterly compliance reports.	Year 1-4	High	<ul style="list-style-type: none"> NCCG budget Bilateral Partners
Establish incident reporting system.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. 	Established incident reporting system.	Report on establishment of incident reporting system.	Year 1-4	High	<ul style="list-style-type: none"> NCCG Budget Bilateral partners Grant
Establish Environmental/ Air quality Laboratory.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Mobility and Works Department. NCCG Public Health Department. 	Established Laboratory.	Report on established laboratory.	Year 1-5	Moderate	<ul style="list-style-type: none"> NCCG budget Bilateral partners Grant

Objective 4.3: To enforce the current and future regulations on air quality management.

Enforce Nairobi Air Quality Act, 2022 and its regulations.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. Security and Compliance Department. 	<ul style="list-style-type: none"> Number of compliance and enforcement inspections undertaken. Fines issued. Legal actions taken for non-compliance. 	Report on air quality compliance and enforcement.	Year 1-5	High	NCCG budget
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ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Initiate, lead and participate in joint compliance and enforcement actions with NEMA Inspectors.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. Security and Compliance Department. 	Number of joint inspections undertaken when required.	Inspection reports.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget NEMA
Collaborate with NEMA in ensuring compliance of listed activities with Emission Licence conditions and minimum emission standards through compliance audits.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NEMA. Security Compliance Department. 	<ul style="list-style-type: none"> Number of compliance and enforcement inspections undertaken. Fines issued. Legal actions taken for non-compliance. 	Report on air quality compliance and enforcement.	Year 2-5	High	<ul style="list-style-type: none"> NCCG budget NEMA

Objective 4.4: To support Nairobi City County departments and facilities in maintaining environmental compliance

Provide NCCG Departments and facilities with technical guidance on air quality matters and legislation in order to assist them in maintaining environmental compliance.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Department of public Health. 	Number of request assistance received and executed from partner departments.	Report on execution of compliance assistance on air quality legislation and standards.	Years 1-5	Moderate	NCCG budget
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ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
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Objective 4.5: To conduct annual compliance and air quality monitoring on listed facilities within the city County.

In consultation with NEMA, ensure compliance by listed facilities on license conditions and minimum emissions standards through compliance audits; issuing of compliance notices; and calling for pollution abatement plans where required.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Built Environment and Urban Planning. • NEMA. 	<ul style="list-style-type: none"> • % of listed facilities served with Pre-compliance or compliance notices. • % of listed facilities with pollution abatement plans. 	Report on compliance of listed facilities.	Year 1-5.	High.	<ul style="list-style-type: none"> • NCCG budget
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Objective 4.6: To involve the city communities in planning and implementation of air quality Plan & programmes.

Participate in, collaborate and support the Nairobi Air quality Working Group.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. 	Number of collaborations.	Report on collaborations.	Year 1-5	High	<ul style="list-style-type: none"> • NCCG budget. • Multilateral Partnerships • Bilateral partners • Grants
Conduct community workshops on air quality management.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Department of Health. • NCCG Department of Mobility and Works. • NCCG Department of Public Engagement. • NCCG Built Environment and Urban Planning. 	Number, nature and composition of workshop.	Workshop report.	Year 1-5	Moderate	<ul style="list-style-type: none"> • NCCG Budget • Bilateral partners • Grants

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Conduct awareness campaigns on health effect of air pollution.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Public Engagement Department. • NCCG Communication Department. 	Number, nature and composition of campaigns.	Campaign Reports.	Year 1-5	Moderate	<ul style="list-style-type: none"> • NCCG Budget • Bilateral partners • Grants
Partner with media and influencers to promote air quality management programmes.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Public Engagement Department. • NCCG Communication Department. 	Number, nature and media engagement.	Report on media engagement.	Year 1-5	Moderate	<ul style="list-style-type: none"> • Bilateral partners • Grants
Engage schools, workplaces and communities in eco-friendly transport initiatives.	<ul style="list-style-type: none"> • NCCG Mobility and Works Department. • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Department of Education. • NCCG Department of Public Health. • Built Environment and Urban Planning. 	Number and nature of schools & workplaces engaged.	Report on engagement initiatives.	Year 1-5	Moderate	<ul style="list-style-type: none"> • Bilateral partners • Grants

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Launch awareness campaigns on benefits of clean mobility.	<ul style="list-style-type: none"> • NCCG Mobility and Works Department. • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Communication and Public Relation Department. • NCCG Department of Public Health. 	Number and Nature of awareness campaigns.	Reports on awareness campaigns.	Year 1-5	Moderate	<ul style="list-style-type: none"> • NCCG budget • Bilateral partners • Grants
Conduct outreach programs to the public service vehicles on issues engine idling and effects to health.	<ul style="list-style-type: none"> • NCCG Department of Environment and Climate Change. • Nairobi City County air pollution control committee. • NCCG Department of Public Health. • NCCG Mobility and Works Department. • NAMATA. • NEMA. 	Number and Nature of outreach programmes.	Reports on outreach programmes.	Year 1-5	Moderate	<ul style="list-style-type: none"> • NCCG budget • Bilateral partners • Grants

ACTIVITY	RESPONSIBLE ACTORS	INDICATORS OF ACHIEVEMENT	MEANS OF VERIFICATION, MONITORING AND EVALUATION	TIMELINE	PRIORITY	POTENTIAL FUNDING SOURCE/ COOPERATION
Engage local influencers, media, and community leaders to advocate for the transition to cleaner energy sources.	<ul style="list-style-type: none"> NCCG Department of Environment and Climate Change. Nairobi City County air pollution control committee. NCCG Department of Communication and Public Relation. NCCG Department of Public Health. Mobility and Works Department. 	Number of audience or community reach.	Reports on engagement.	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Multilateral partners Bilateral partners Grants
Promote alternative energy source such as electric, hydrogen and CNG.	<ul style="list-style-type: none"> NCCG Department of Environment & Climate Change. Nairobi City County air pollution control committee. NCCG Department of Communication and Public Relation. NCCG Department of Public Health. Mobility and Works Department. 	<ul style="list-style-type: none"> Number of audience & community reach. Rate of adoption of alternative energy sources. 	<ul style="list-style-type: none"> Reports on promotions. Reports on adoption of alternative energy sources. 	Year 1-5	High	<ul style="list-style-type: none"> NCCG budget Multilateral Partners Bilateral partners Grants

CHAPTER

04:

MONITORING, EVALUATION AND LEARNING FRAMEWORK

Evidence – based progress reporting provides learning points informing future interventions on air quality management in Nairobi City County. Monitoring tools have set targets and measure progress after pre-defined period indicated in the implementation plan (table 8). This provide opportunities for tracking achievements and undertaking remedial measures where there are gaps in the implementation process. The monitoring and evaluation output information for the final reviews and form basis for a revised Plan after the lapse of the implementation period. The implementation matrix has provided the indicators and means of verification. These will be evaluated by tools in Annex 1 and align to NCCG monitoring and evaluation frameworks for:

1. Annual work plans - to incorporate the activities per year
2. Quarterly progress reports
3. Annual/financial year reports
4. Mid-term evaluations
5. End term evaluation: to be done at the end of the Plan's period (2029).
6. The County Integrated Development Plans

The work plans for implementing departments will embed the actions and activities outlined in this air quality action plan. Templates for reporting on progress of implementation are provided (table 9, 10, 11).





Table 9: Quarterly progress reporting template

Objective	Expected Output	Expected Indicator	Annual Target	Financial Year Quarter: Indicate Time			Cumulative To Date			Remedial Measures
				Target	Actual	Variance	Target	Actual	Variance	

Table 10: Financial year progress reporting template

Goal	Expected Output	Expected Indicator	Financial Year Quarter: Indicate Time			Cumulative To Date			Remedial Measures
			Target	Actual	Variance	Target	Actual	Variance	

Table 11: Evaluation reporting template

Goal	Outcome	Outcome Indicator	Baseline		Mid - Term Evaluation		End - Term Evaluation		Challenges	Remedial Measures
			Value	Year	Target	Achievement	Target	Achievement		
1										
2										
3										
4										

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ANNEXES

Annex 1: List of Contributors

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17.	Crick Jared Mbory	Nairobi City County Government (NCCG)
18.	Davies Okoth	Nairobi City County Government (NCCG)
19.	Lawrence Mwangi	Nairobi City County Government (NCCG)
20.	Lazarus Kivai	Nairobi City County Government (NCCG)
21.	Noah Ngeno	Nairobi City County Government (NCCG)
22.	Fancy Musili	Nairobi City County Government (NCCG)
23.	Calvin Odhiambo	Nairobi City County Government (NCCG)
24.	Diana Pambo	Nairobi City County Government (NCCG)
25.	Nancy Nasepeya	Nairobi City County Government (NCCG)
26.	Gillian Onyango	Nairobi City County Government (NCCG)
27.	Dr. Jackline Lidubwi, PhD	Africa Nazarene University (ANU)
28.	Tom Randa	African Centre for Technology Studies (ACTS)
29.	Anthony Kimotho	Air Quality Systems East Africa (AQS-EA)
30.	Prof. Maina Muniafu	Air Quality Systems East Africa (AQS-EA)
31.	Joachim Tamaro	CENEX Consults
32.	Dr. Victor Indasi, PhD	Clean Air Fund (CAF)

33.	Lydia Okolla	Clean Air Fund (CAF)
34.	Jacob Olonde	Environmental Capacity and Sustainability (ECAS) Institute
35.	Samuel Ochieng	Environmental Capacity and Sustainability (ECAS) Institute
36.	Vivian Tawarar	Environmental Capacity and Sustainability (ECAS) Institute
37.	Isabella Nzioki	GROOTS Kenya
38.	Victor Nthusi	Health Effects Institute (HEI)
39.	Eng. Michael Muchiri	Independent Expert
40.	Margaret Kariuki	Independent Expert
41.	Georgina Wachuka	Kenya Association of Manufacturers (KAM)
42.	Dennis Weche	Kikaka Community Based Organization
43.	Lameck Anami	Kikaka Community Based Organization
44.	Kentice Tikolo	Kusudi Cause Communications
45.	Eng. Gideon Lubisia	Makerere University - AirQo Project
46.	Juddy Arieko	National Environment Management Authority (NEMA)
47.	Charles Aholi	National Public Transport Alliance (NAPTA)
48.	Sellellah Okoth	National Treasury - FLLoCA Program
49.	Dr. Romanus Opiyo	Stockholm Environment Institute (SEI) – Africa Centre
50.	Javan Odenyo	Stockholm Environment Institute (SEI) – Africa Centre
51.	Ngongang Wandji	Stockholm Environment Institute (SEI) – Africa Centre
52.	Dr. Anne Mutahi, PhD	University of Nairobi (UoN)
53.	Simon Bartilol	University of Nairobi (UoN)
54.	Prof. Stephen Anyango	University of Nairobi (UoN) – Centre for Advanced Studies in Environmental Law & Policy (CASELAP)
55.	Maryam Wangeshi	UrbanBetter Nairobi
56.	Dr. George Mwaniki	World Resources Institute (WRI)
57.	Ivy Murgor	World Resources Institute (WRI)
58.	Purity Munyambu	World Resources Institute (WRI)
59.	Gerphas Opondo	Environmental Compliance Institute (ECI)
60.	Dr. Godwin Opinde	Environmental Compliance Institute (ECI)
61.	Dr. Victor Ikawa	Environmental Compliance Institute (ECI)
62.	Ago Sam	Environmental Compliance Institute (ECI)
63.	Everlyne Onyango	Environmental Compliance Institute (ECI)
64.	Lawrence Nzuve	Environmental Compliance Institute (ECI)
65.	George Odhiambo	Environmental Compliance Institute (ECI)
66.	David Kichana	Environmental Compliance Institute (ECI)
67.	Simon Peter Keyah	Environmental Compliance Institute (ECI)
68.	Paul Kaberere	Environmental Compliance Institute (ECI)

