airqo
Breathe Clean

Makerere University

Policy Brief

Evidence-informed intervention pathways for clean air in Jinja City, Uganda

Content

Message from the **City Mayor**

Dear Residents and Visitors of Jinja City,

As your Mayor, I am pleased to present this policy brief on evidence-informed intervention pathways for clean air in Jinja City, Uganda. Urban air pollution poses a significant public health challenge, particularly in rapidly urbanizing cities like ours. This document provides a comprehensive overview of the current state of air quality in Jinja, drawing on data from continuous monitoring and public perception studies.

Our city, known for its historical significance and thriving industrial sector, faces unique challenges and opportunities in addressing air pollution. The brief outlines actionable pathways to reduce air pollution, leveraging existing institutional mechanisms, policy frameworks, and stakeholder engagement. These pathways align with the best practices recommended by the World Bank for enhancing city competitiveness and air quality management.

In accordance with the National Environment Management Act of 2019, the National Effluent Discharge Standards of 2000, and the newly introduced Air Quality Regulations by the National Environment Management Authority (NEMA) in 2024, Jinja City is committed to upholding rigorous environmental standards. Furthermore, our collaboration with the Makerere University AirQo project, led by Prof Engineer Bainomugisha, highlights our commitment to leveraging scientific data and expertise to guide our actions.

This policy brief not only aims to improve the air quality for the residents of Jinja but also enhances the city's appeal to tourists. Cleaner air contributes to better health outcomes, increased quality of life, and a more attractive environment for visitors, promoting tourism and economic growth.

In the development of this policy brief, we extend our sincere appreciation to the AirQo team at Makerere University, under the leadership for their contributions. Their expertise and data-driven approach have played a crucial role in shaping our strategies for addressing air pollution. Additionally, I acknowledge and appreciate the collaborative efforts of the Jinja City Executive Committee, Works and Natural Resources Committee, Finance Planning and Administration Committee, Social Services Committee, and Technical Planning Committee for their support and dedication to this endeavor.

I urge all stakeholders, from governmental departments to private citizens, to collaborate in implementing these recommendations. By doing so, we can ensure a healthier, more sustainable environment for current and future generations in Jinja City.

As your Mayor, I am fully committed to leading this initiative. Together, let us make Jinja a cleaner, greener city, benefiting both our residents and the tourists who come to experience our beautiful city.

Sincerely

Peter Okocha Kasolo
MAYOR

Executive Summary

Urban air pollution remains an important public health challenge for populations in low-resourced countries in Africa and the global South. Many fast-urbanising cities in Africa lack the capacity to develop data-informed interventions for tackling air pollution and yet population exposure is more than 10 times the recommended health guidelines for many cities. This policy brief seeks to define evidence-informed and contextual pathways for accelerating action to tackle air pollution in Jinja city, a historical, yet fast-urbanising secondary city and an Industrial hub in Uganda. The brief explores the current air quality status from the continuous network of calibrated low-cost sensors, public perceptions from stakeholder engagements, and the existing institutional mechanisms and policy framework to help define the actionable pathways for clean air while adopting the participatory philosophy for sustained engagements.

Air pollution levels varied between annual mean value of 25.14 μg/m³ ,26.85 μg/m³ and 26.93 μg/m³ for the period 2021, 2022, 2023, which is 5.03 to 5.39 times the annual WHO health guidelines of 5 μg/m³. The known air pollution drivers in the city include waste management but the stakeholder engagement revealed a considerable lack of public awareness of the specific challenges of air pollution. Environmental regulatory frameworks exist at both national and city levels facilitated by robust institutional mechanisms. However, we find capacity and implementation gaps that hinder the development of contextual interventions which require a broad understanding of the evidence on air quality coupled with the potential avenues for mainstreaming actions through existing institutional and policy infrastructure. This brief proposes a participatory and multi-pronged approach encompassing short and mid-term actions from defining avenues for mainstreaming actions to the development of targeted local policies and regulations. These recommendations adapt the World Bank framework of best practices for enhancing city competitiveness, and are broken down as follows:

- Institutions and regulations
    - Define avenues for integrating air quality actions e.g. through planning approvals, environmental audits, etc.
    - Developing targeted resources and tools for accelerating data-informed actions e.g. Clean air action plans
    - Establishing local air quality goals for the city
    - Development and implementation of specific local air quality regulations e.g. ordinances, standards
- Infrastructure
    - Integrate air quality cinsierations into infrastructure planning and management e.g. planning approvals, facilities environmental audits
    - Leverage existing infrastructure projects to accommodate inclusive mobility e.g. walking lanes, cycle lanes
    - Enhancement of infrastructure for waste management including incentivising waste collection centres
- Evidence informed -education and Awareness
    - Existing research collaboration for increased data evidence generation and awareness
    - Capacity training on air quality awareness
    - Existing awareness platforms for mass public awareness on green initiatives such as non-motorised transportation i.e. walking and cycling

Background:
Urban air pollution as a global phenomenon

Urban air pollution poses a significant public health threat in contemporary urban communities and disproportionately impacts cities in the global South including sub-Saharan Africa which accounts for more than 10% of global annual mortality due to air pollution. Poor air quality is also closely connected to climate change and exacerbates its effects in communities with limited resilience, further deepening the climate-related health disparities among vulnerable populations.

The UN Sustainable Development Goals (SDGs) 3 and 11 enjoin countries to ensure healthy lives and promote well-being for all ages and to make cities inclusive, safe, resilient, and sustainable respectively[1]. However, many cities in sub-Saharan Africa lack the ability and resources to develop tailored interventions to improve air quality[2]. Emerging evidence shows that many cities experience pollution levels above 10 times the WHO health guidelines[3] [4] [5]. This means that populations already struggling with other socio-economic challenges like malnutrition, access to clean water and livelihood face further risks of exposure.

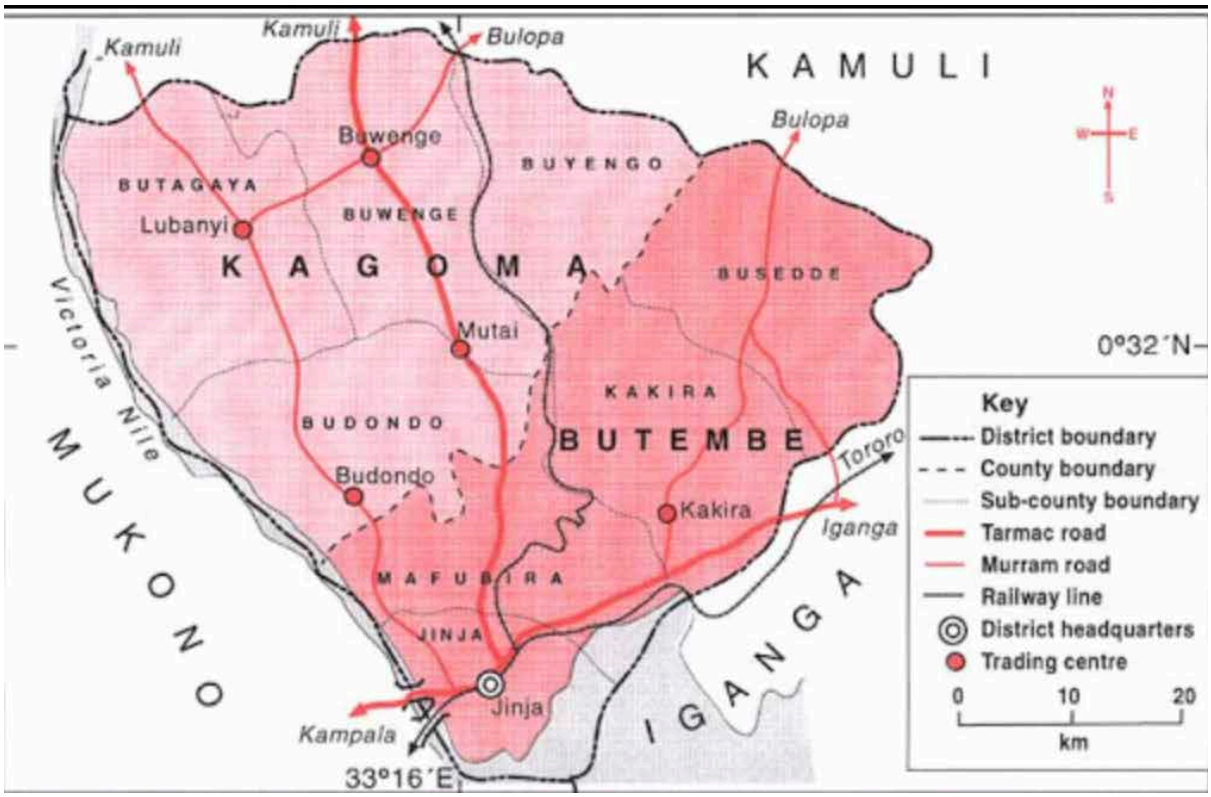
1. United Nations Development Programme. "*Sustainable Development Goals." UNDP*, Accessed (July, 2023) from https://www.undp.org/sustainable-development-goals
2. Cohen, Aaron J et al. Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015.
3. World Health Organization. *WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide*. World Health Organization, 2021
4. Jinja Municipal Council. (n.d.). Overview. Retrieved (July 2023), from https://jinja.go.ug/lg/overview
5. Okure et al

This policy brief aims to define evidence-informed pathways for targeted actions to improve air quality in Jinja city, a fast-urbanising city in Uganda. Jinja city is a historical town in Busoga region, in the eastern part of Uganda, and historically known for the thriving industrial sector in Uganda, currently hosting over 100 industrial facilities[6]. The city is about 81 km from Kampala City by road and has an average elevation of 1,204 m above sea level. It sits along the shores of Lake Victoria and the source of the River Nile. As of 2020, the population of this city was projected to be 515,100 covering an area of 688.4 km^2 with a population density of 749/km^2 The population by gender at the time was estimated to comprise 262,400 males (50.9%) and 252,700 females (49.1%)[7].

6. Ibid

7. Ibi

Map of Jinja City



Jinja as a fast-urbanising city

The air pollution challenge

Like many cities in Uganda, there has been no established continuous monitoring network for air quality although studies have estimated air pollution to be up to 11 times the WHO annual guidelines of 5µg/m3. Jinja is a fast urbanising city with many industries and remains a bustling industrial hub employing over 10,000 people and has recently been designated by the government of Uganda as an industrial city[1] The main industry categories include; agro-processing metal industries,fish processing and text industries etc.

1 Supra note 4

Despite the numerous industrial facilities, there are still no distinctive pollution drivers unique to Jinja city, as the typical urban challenges of waste management, public transport, and limited access to cleaner cooking still remain prevalent.

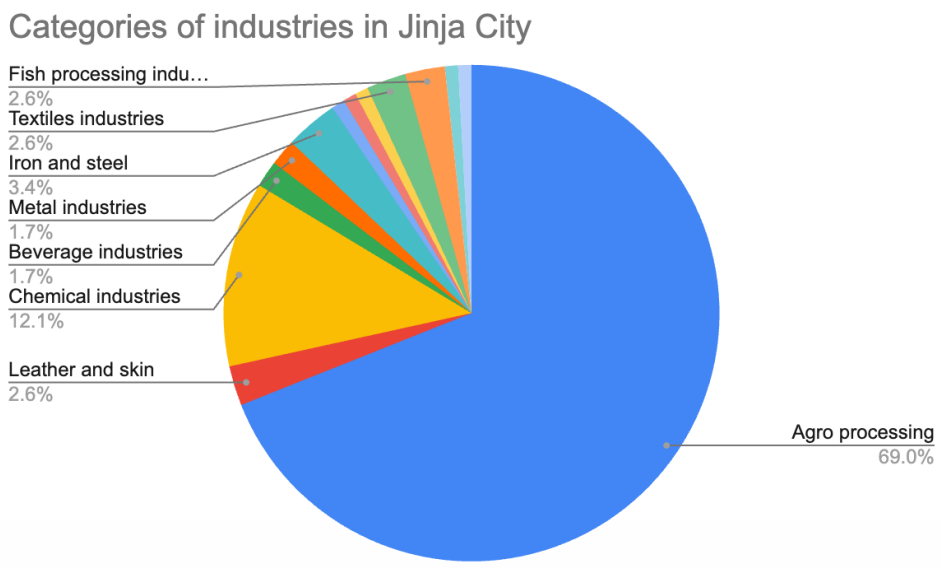
The city has an ongoing collaboration with Makerere University AirQo to establish a continuous air quality monitoring network for particles across two divisions in Jinja city[1]. From the monitoring network, it can be seen that air quality varies considerably and exceeds the WHO guidelines by up to 5.3 times the annual guidelines between 2021 and 2023This is consistent with previous findings on the same.[2 3 4]

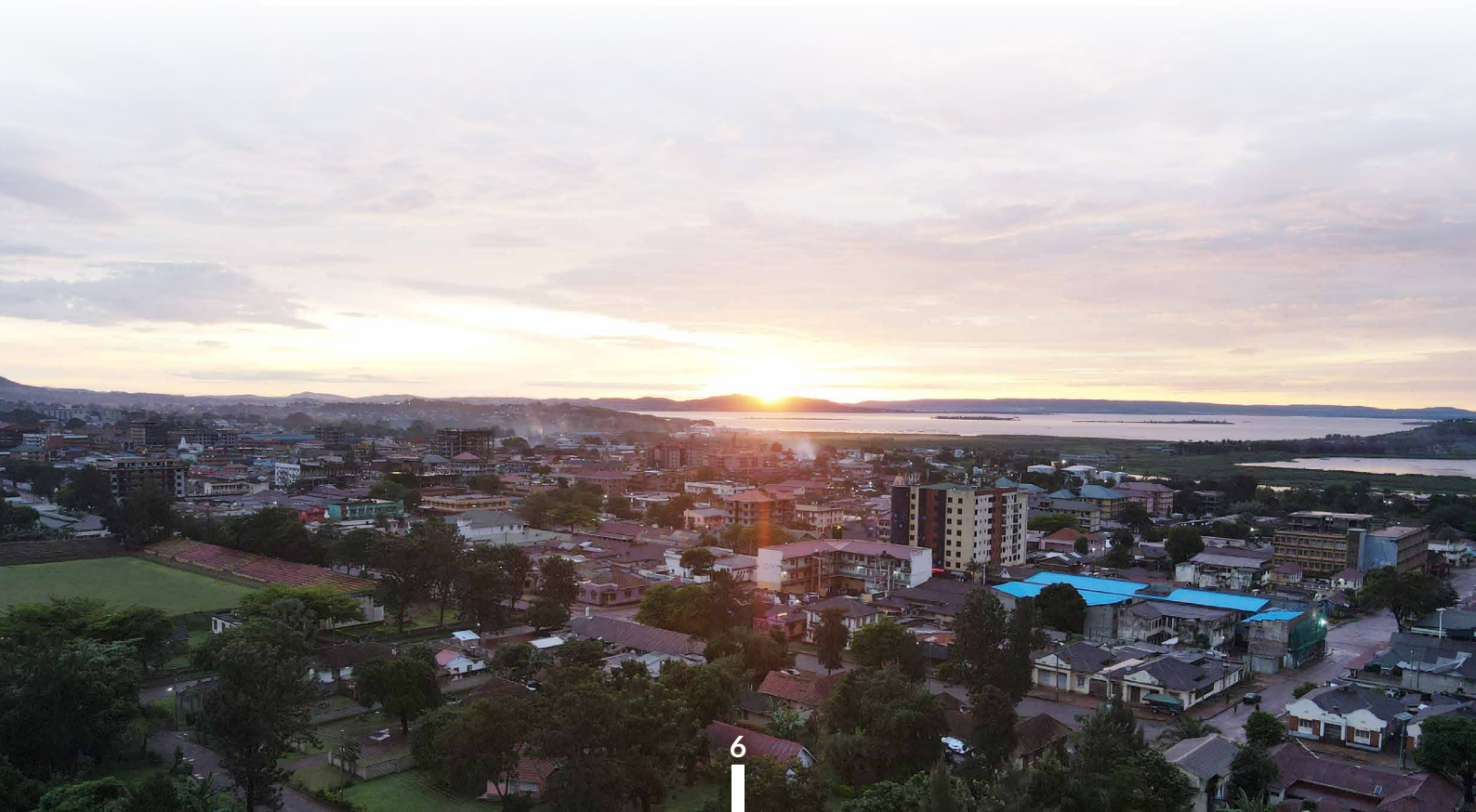
1. WeHubit "A breath of fresh Air for jinja City Residents" (accessed July, 2023). https://www.wehubit.be/en/node/202

2. B. J. Kirenga, Q. Meng, F. Van Gemert, H. Aanyu-Tukamuhebwa, N. Chavannes, A. Katamba, and V. Mohsenin, The state of ambient air quality in two Ugandan cities.

3. Eric Coker et al
4. Okure et al

Pie chart showing proportion of industries in Jinja





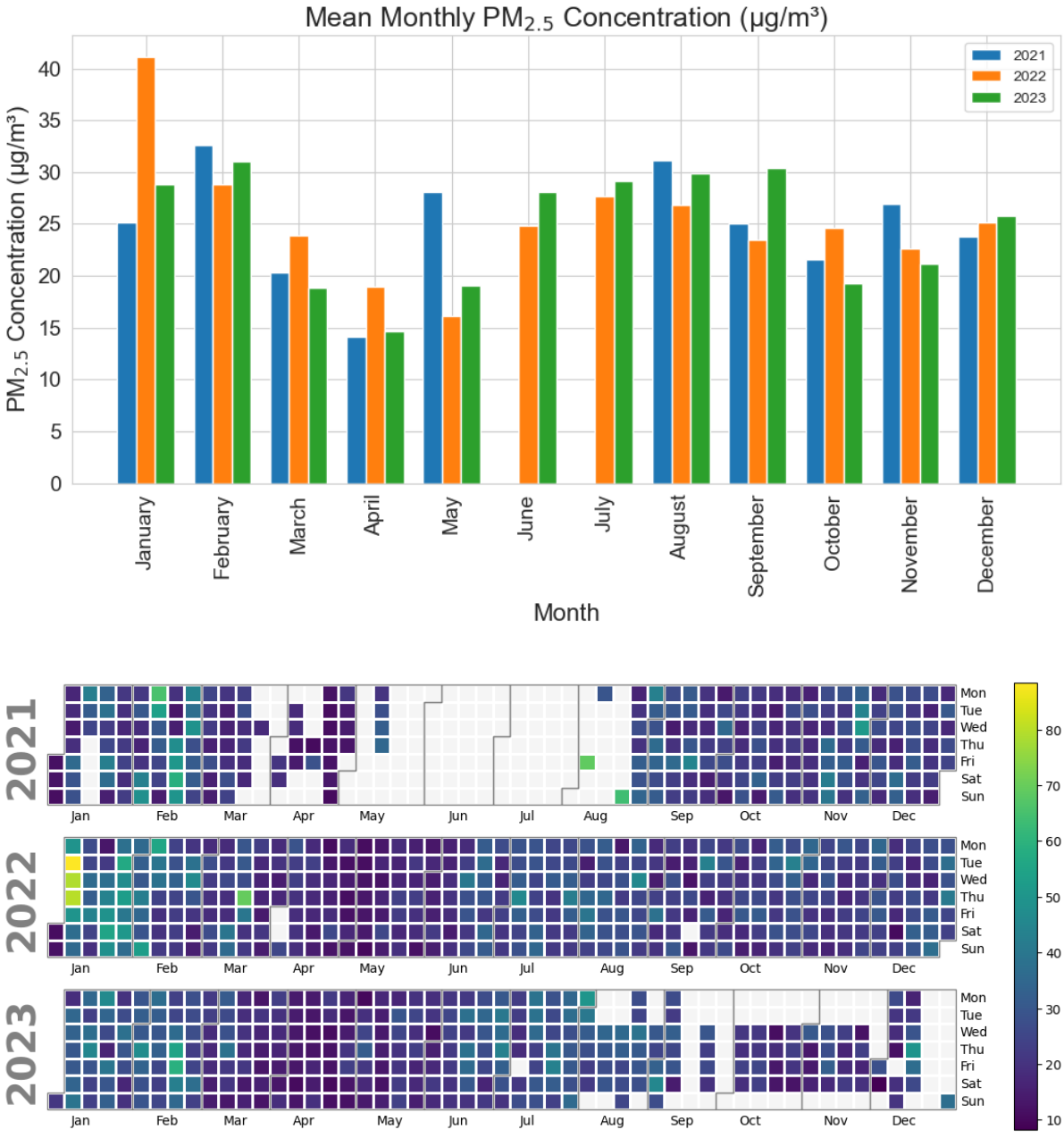


Figure 2 : The Monthly Mean Values Of $PM_{2.5}$ 2021, 2022 and 2023

Public perception

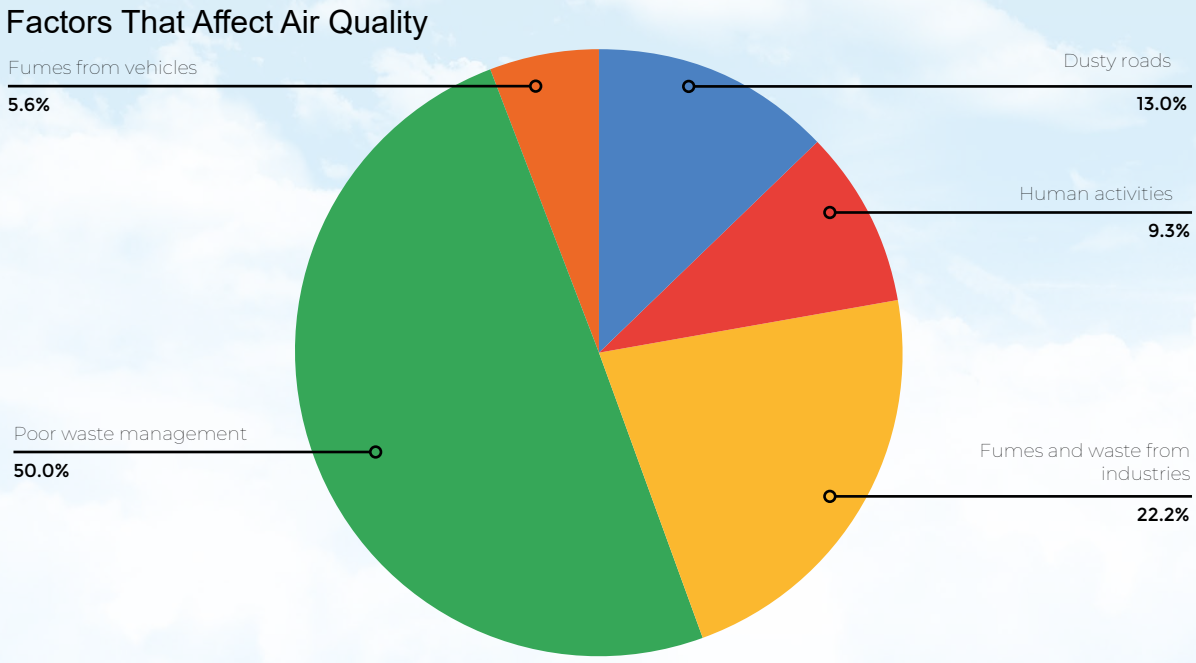
An assessment was conducted among stakeholder groups to explore the attitudes, knowledge and perception on air pollution in their respective communities. The stakeholder engagement was conducted through six focus groups between (November 2021). The participants were recruited from Jinja and included authorities and residents from Bugembe, Budondo, Mafubira, Jinja Central and Walukuba-Masese communities to be representative of the demographic and social stratifications of Jinja. The focus group engagement was delivered through semi-structured interviews in the form of a survey. There was a wide measure of variation in the views on air pollution although generally skewed toward waste and industrial concerns, which underscored the need for sustained outreach and education initiatives.This also aligns with the findings in our scoping review (Okello et al. 2022) on 20 years of air quality management in Africa where only 5% of the efforts have been dedicated towards education and awareness.. Stakeholders expressed a shared belief that the government bears the primary responsibility for ensuring clean air, followed by individual citizens. The stakeholder views are summarised as follows:

> *"My village is called factory village — synonymous with the name- 'the village is surrounded by factories. We breathe toxic air from the industries as well as a lot of dust from the unpaved roads.*

> *"Sometimes by just passing the road, you might blow your nose and you see that it has some dust which means that the air you are breathing is not good.*

> *"Our children are affected by the emissions from the factories, some of the factories discharge foul contaminated air, which affects us in the community"*

> *Sometimes when you leave home the wife just removes the bed sheets because if she leaves them you might find the bed and you think the dust has just been poured there".*



The need for integrated action

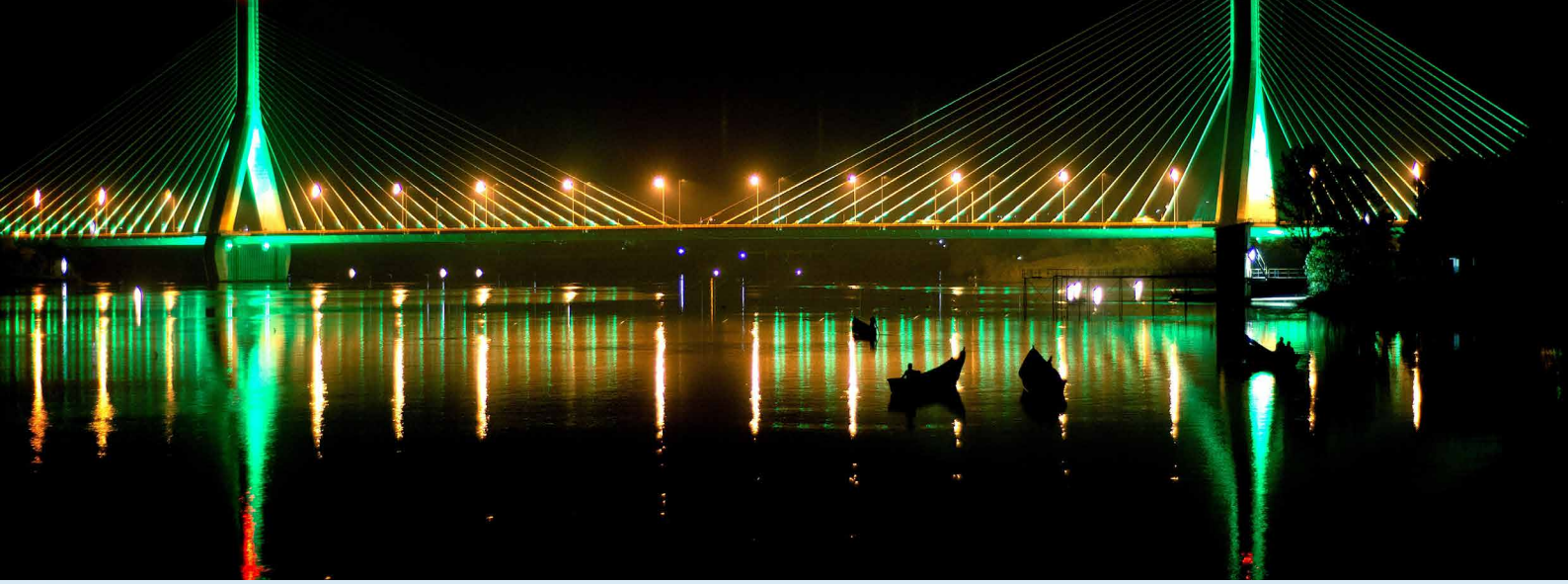
Uganda's institutional framework is designed to support the country's governance structure and ensure effective administration and service delivery. At the top tier is the Presidency, headed by the executive, who serves as the head of state and government. The executive branch comprises various ministries, each responsible for specific sectors, such as health, education, finance, and more.

The legislative arm is represented by the Parliament of Uganda, a unicameral body responsible for enacting laws/ legislation, scrutinizing the executive, and representing the interests of the citizens. The judiciary, an independent arm, upholds the rule of law and ensures justice through the court structures, among others.

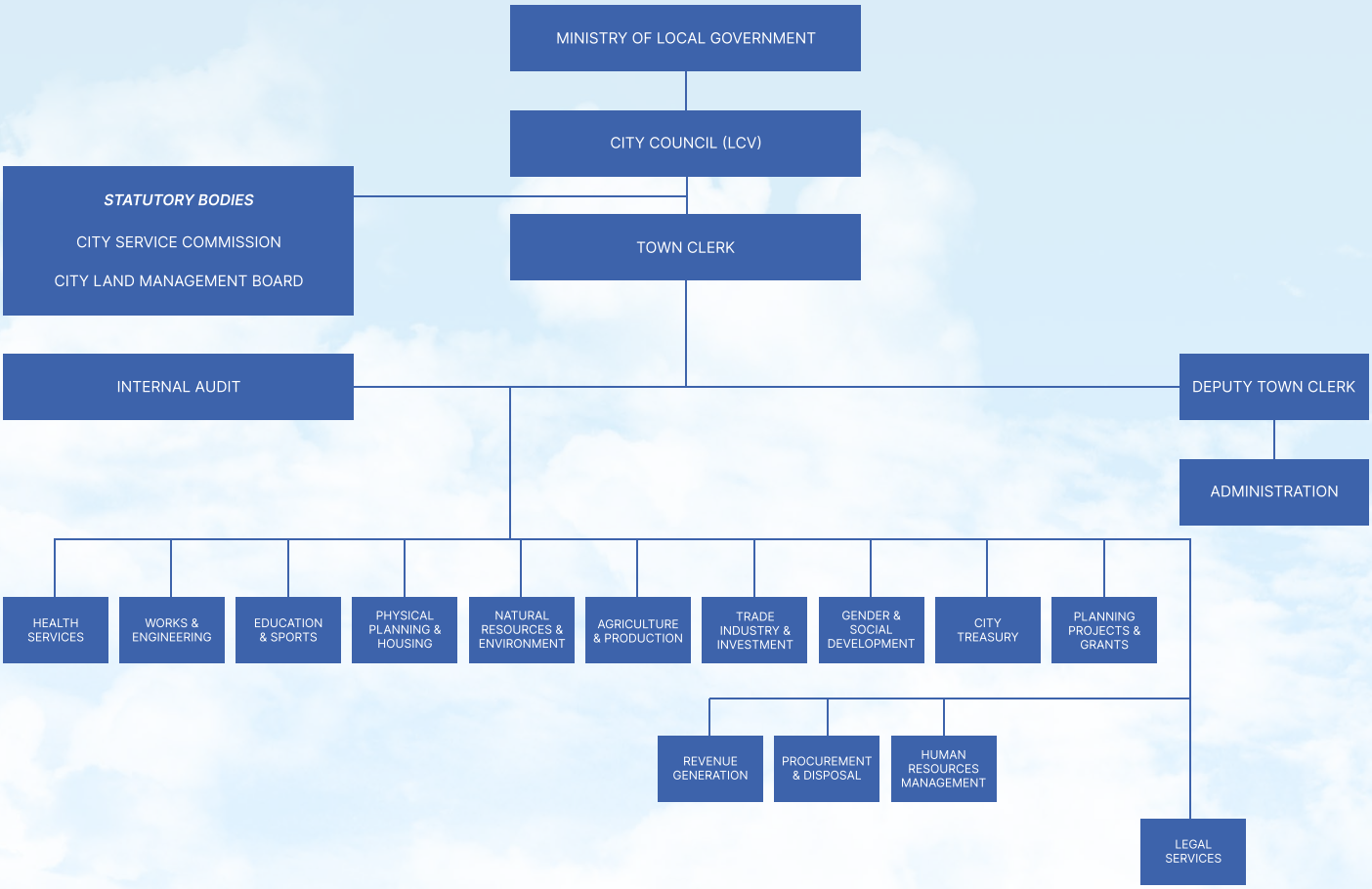
Local governance is facilitated through Local Governments, consisting of districts, municipalities, and sub-counties. Local Councils at different levels play a crucial role in decentralising decision-making and addressing the specific needs of communities.

Jinja City has taken action in addressing the pressing issue of air pollution through a robust regulatory framework that operates at both the national and local government levels. This framework encompasses key legislations such as the National Environment Management Act of 20191, the National Effluent Discharge Standards established in 2000, and the Jinja Waste Management Ordinance. These legal instruments provide a foundation for regulating and mitigating sources of air pollution, demonstrating the city's commitment to environmental stewardship.

1. The National Environmental Act, 2019



Jinja City Organogram



Pathways to reducing air pollution and exposure

The recommendations presented are based on the World Bank's best practices framework to enhance city competitiveness and advance air quality management efforts. The three principal pillars of the framework provide a comprehensive plan to improve air quality. The first pillar, Institutions and Regulations, recommends integrating air quality actions into planning approvals and environmental audits, creating targeted resources such as Clean Air Action Plans, and developing specific local air quality regulations like ordinances. The second pillar, Infrastructure, emphasizes the importance of utilizing existing projects to promote inclusive mobility, incorporating walking and cycling lanes, and improving waste management infrastructure. The third pillar, Evidence-Informed Education and Awareness, sheds light on collaborative efforts to increase data evidence generation, capacity training on air quality awareness, and using existing platforms for mass public education on green initiatives, particularly non-motorized transportation like walking and cycling. By implementing these recommendations, cities can take a step towards a cleaner and healthier environment. You can find a detailed outline of these recommendations in the following table.

Table 1: Contextual recommendations for action

Timelines	Recommendations	Responsibilities and key stakeholders
	Institution and regulations	
Short-term	Define avenues for integrating air quality actions e.g. through planning approvals, environmental audits, etc.	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies
	Develop targeted resources and tools for accelerating data-informed actions e.g. Clean air action plans	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies, development partners
Long-term	Establish air quality goals informed by monitoring data, such as defining a time frame to reduce pollution concentrations by a specific percentage in identified areas with elevated pollution levels	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies
	Development and implementation of specific local air quality regulations e.g. ordinances	Primary responsibility: Jinja City Political head Stakeholders: Ministries, Departments, and Agencies
	Infrastructure	
Short- term	Enhance waste management infrastructure, focusing on enhancing infrastructure for waste management to address air pollution concerns arising from waste management practices.This includes the implementation of incentives for waste collection centers	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies, Development partners
	Integration air quality considerations in infrastructure planning such as approvals and environmental audits for ongoing and upcoming infrastructure projects.	Primary responsibility: Department of planning Stakeholders: Ministries, Departments, and Agencies
Long-term	Promote inclusive mobility infrastructure: Leverage existing infrastructure projects to prioritize inclusive mobility solutions.e.g the creation of walking lanes and cycle lanes.	Primary responsibility: Department of Works and Engineering Stakeholders: Ministries, Departments, and Agencies
	Evidence-informed education and awareness	
Short-term	Enhance research collaboration for data evidence generation for informed decision-making and increased awareness for air quality, e.g., through information dissemination	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies
	Implement targeted capacity-building programs focused on air quality awareness for various stakeholders.	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies
	Leverage established awareness platforms to conduct mass public awareness campaigns on green initiatives, with a specific emphasis on non-motorized transportation options like walking and cycling.	Primary responsibility: Department of of Works and Engineering Stakeholders: Ministries, Departments, and Agencies
	Define avenues for generating and maintaining evidence on air quality.	Primary responsibility: Department of Natural resources Stakeholders: Development partners
Long term	Define and analyze the stakeholder landscape comprehensively, identifying key players and influencers to form a foundation for tailored engagement strategies and targeted awareness initiatives.	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies, community members.
	Establish sector-specific contributions to air pollution, utilizing tools like emissions inventories to ensure a targeted approach to mitigating pollution from different sources.	Primary responsibility: Department of Natural Resources Stakeholders: Ministries, Departments, and Agencies
	Identify the specific training needs within various stakeholder groups, ensuring that awareness programs are customized to address the knowledge gaps effectively.	Primary responsibility: Department of Natural Resources Stakeholders: Development partners
	Facilitate knowledge exchange programs with other cities, sharing best practices, experiences, and successful strategies for addressing air quality challenges.	Primary responsibility: Department of Natural Resources Stakeholders: Development partners,Ministries, Departments, and Agencies

Photo of Jinja City

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Acknowledgement

Jinja City Executive Committee

Jinja City Works and natural resources committee

Jinja City Finance planning and administration committee

Jinja City Social services committee

Jinja City Technical planning committee

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7. B. J. Kirenga, Q. Meng, F. Van Gemert, H. Aanyu-Tukamuhebwa, N. Chavannes, A. Katamba, and V. Mohsenin, The state of ambient air quality in two Ugandan cities: a pilot cross-sectional spatial assessment, International Journal of Environmental Research and Public Health 12, no. 7 (2015): 8075-8091.

8.The National Environmental Act, 2019 , The Uganda Gazette No. 10, Volume CXII, dated 7th March, 2019.