
A REVIEW PAPER ON TRAFFIC POLLUTION

Mohit Rastogi*

*Assistant Professor,
Teerthanker Mahaveer Institute of Management and Technology,
Moradabad, Uttar Pradesh, INDIA

Email id: mohit.management@tmu.ac.in

DOI: 10.5958/2249-7307.2021.00050.5

ABSTRACT

The most common sources of air pollution in cities are traffic congestion and traffic-related pollutants. Rapid urbanization in emerging nations has resulted in a large-scale expansion of motor vehicle usage, causing cities to become more crowded and polluting. There is a growing recognition that the current state of air quality in East African cities is unacceptably poor. This study examines existing traffic pollution issues in Nairobi, Kenya, and how they may be solved. The article starts with an overview of urbanization and its impact on pollution. It then goes on to look at the particular example of Nairobi as it seeks answers to the harmful consequences of pollution via a lens that views traffic congestion as critical to reducing traffic-related air pollution. It argues that the most efficient approach to reduce traffic congestion and, therefore, traffic pollution is to combine infrastructural, policy, regulatory, and softer measures. Furthermore, the study emphasizes the need for further research into the lived experience of navigating everyday life in Nairobi, as well as deeper investigation of the social, economic, and environmental viability of possible city solutions. While Nairobi is utilized as a case study city, the lessons gained are applicable to cities across the East African area, which share many of the same characteristics of traffic congestion and pollution.

KEYWORDS: *Economic, Nairobi, Pollution, Traffic, Transport.*

1. INTRODUCTION

Human progress and advanced civilization's notion of cultural and economic achievement have been centered on cities. The migration of people to live in cities and big towns has increased the percentage of the world's population living in urban regions from approximately 5% to 50% during the last two centuries. This percentage is expected to climb to approximately 66 percent by 2050, with emerging nations accounting for the majority of the increase. Urbanization has been linked to increased strain on cities all around the globe. "The rapid pace of urbanization...has not resulted in increased living conditions (better-paying employment, infrastructure and services, clean and modern power, drinkable water, and so on)". The developing world's increasing urbanization has resulted in a huge population of urban poor[1]–[5]."

The increasing concentration of people in cities in emerging and developing economies provides human resources that contribute to future economic development, but it also increases the pressure on already vulnerable resources such as land, water, housing, and other infrastructure such as transportation. Congestion, accidents, community severance, and pollution are all effects of motorized transportation in cities. The author found that transportation is the largest contributor to urban air pollution, with the highest levels of exposure and pollution at roadside sites.

This study focuses on the consequences of traffic-related pollution on people in developing nation cities, with a particular emphasis on Nairobi, and how such effects may be effectively handled to enhance the sustainability of metropolitan areas for inhabitants, tourists, the environment, and the

economy. The article is based in large part on a desk review that is influenced by personal experience. It starts with a discussion on traffic pollution in developing countries and cities before moving on to Nairobi, Kenya, in East Africa. The possible mitigation strategies for reducing the effect of traffic pollution in places like Nairobi. In order to mitigate environmental impacts, Section 4 addresses the need for more holistic approaches to city design. Future study, according to the assessment, may help us better understand how to minimize and mitigate traffic pollution impacts in developing countries. The last part contains the conclusion[6], [7].

1.1 Historical context:

1.1.1 The issue:

“As cities expand and become wealthier, motorized vehicle ownership and usage - including private cars (as in Eastern Europe), small buses (as in most of Latin America and Africa), and 2-3 wheelers (as in Asia) - increases faster than available road space. Therefore, traffic congestion and air pollution are worsened. The prescribed remedies will vary depending on the sources of pollution.”

In increasing motorization is associated with urban economic development. While there are commercial drivers for increasing reliance on motor vehicles (for example, to enable the supply of goods to/export of products from cities), cultural effects can mean that individuals aspire to meet their personal mobility needs through car ownership as a result of increased disposable income and poor public transportation options. However, as people on low incomes who are already marginalized tend to be further marginalized in “peripheral locations or sometimes in inhospitable inner-city locations, with very poor access by the only modes of transport available to them, walking, non-motorized or public transportation”. This can exacerbate social divisions and inequity emphasizes the necessity for the poorer majority to be involved in participatory procedures in transportation planning in places such as Nairobi in order to eliminate "existing power dynamics and prevailing urban ideologies that promote auto mobility, which perpetuates spatial and social segregation[8]."

The unsustainable nature of continued reliance on fossil fuel-based transportation has been recognized in many developed and developing countries, and several infrastructure, policy, and alternative interventions have been tested to reduce the environmental pollution associated with mobility while maintaining and/or improving accessibility. Increased provision of pedestrian and cycling facilities in Groningen, prohibition of city center entry by license plate in Mexico City, and congestion pricing in London are just a few instances of such initiatives. In 2017, Santiago, Chile received the Institute for Transportation & Development Policy's (ITDP) Sustainable Transport Award for significant improvements in pedestrian space, cycling, and public transportation. Several major roadways in the city have been rebuilt to reduce vehicle traffic and enhance pedestrian, bicycle, and transit access. The ITDP bestowed the prize because of the high quality and transformational scope of these initiatives, as well as the fact that they were accompanied by policy reforms, education programs, and a significant rise in the percentage of people who cycle[9]. In the absence of pollution mitigation measures and other ameliorative interventions, an urban cycle of rapid economic and population growth continues, bringing with it the negative consequences of increased motorization, such as increased risk of road traffic accidents and air pollution, severance, fuel waste, and congestion. Congestion may cause productivity obstacles, as we will see in a moment. For example, traffic bottlenecks in So Paulo were projected to have cost \$17.8 billion in 2012, which is almost 1% of Brazil's GDP. Given the connection between traffic congestion and economic competitiveness, the following UN assessment of some of the major contributions to social and environmental un sustainability in cities is also important: “Congestion, pollution, changing economic centers, and population patterns pose immediate risks to lives and livelihoods in many cities in both developed and

developing nations. The transportation environment in urban agglomerations is often inequitable, leaving poor and handicapped individuals with insufficient access to the city's economic and social centers. Climate change adds a new level of urgency and complexity to the issues that decision-makers must face in order to build sustainable cities.”

According to the United Nations Environment Programme (UNEP), Africa will account for half of global population growth in the next 30 years, which, if uncontrolled, would result in a significant increase in the number of vehicles and emissions in African cities:

The necessity to mitigate the impacts of transportation in urban settings is well understood. The air quality in African cities is reported to be bad “...because there are so few new vehicles, with the overwhelming majority arriving secondhand from Japan and Europe with their catalytic converters and air filters dismantled.” It is in risk of becoming a dump for the world's old automobiles, importing vehicles that no longer satisfy the pollution regulations of developed countries”. Urban regions dominated by fossil fuels must be replaced with more socially varied settings where economic and social activities intersect and residents' well-being is improved. The UN Secretary-High-Level General's Advisory Group on Sustainable Transportation emphasizes the need for transportation planning, policy, and investment decisions to be based on the three dimensions of sustainable development [social development, environmental (including climate) impacts, and economic growth] as well as a full life cycle analysis in its recommendations[10].

1.1.2 Nairobi Case:

Nairobi has a population of 3.915 million people and a land area of 696 square kilometers. The city is unique in that it contains a national park in the center of the city, which is home to endangered black rhinos and other wildlife. Nairobi is a significant tourist gateway for safaris and other types of vacations due to its animal appeal and other more distant attractions. Kenya's capital, Nairobi, is one of East Africa's biggest cities and serves as the region's financial, diplomatic, and communication hub. According to a recent Oxford Business Group study, Kenya has made significant progress in consolidating its position as the region's main transport and logistics hub. However, it also implies that, although transportation investment is acknowledged as critical, there remains a “substantial infrastructure deficit” in the United States. The Kenya Roads Board sheds further light on the apparently contradictory connection between demand for transportation and infrastructure investment required for long-term development. It states that “the transport sector in Kenya combines international quality operators and services, a somewhat rundown infrastructure, and some inefficient and ineffective institutions”, and goes on to say that “the transport sector in Kenya.

1.2 Infrastructure modifications that are currently taking place:

A number of political comments, indicating moves toward constructive action, indicate that the necessity for a redirection of infrastructure investment in Nairobi away from traditional road network development has been recognized. This is significant because there is a long-standing (since 1925) impact in transportation policy and practice known as "generated traffic", in which new roads are seen to create additional traffic. Nonetheless, Nairobi's governor has indicated that 20% of the road money would be earmarked for public transportation and pedestrian and cycling upgrades, as previously announced. For the strategy to succeed, there must be responsibility for the safeguarding of these funds, as well as strong decision-making processes to guarantee that spending is prioritized for projects that will benefit existing and future public transportation users, pedestrians, and cyclists the most. To enhance the chance that any new infrastructure will satisfy people's needs, users must be co-designers of projects. This will raise the likelihood of new facilities being used. Complementary safety audits of the new infrastructure, as well as funding for its upkeep, are critical to the long-term viability of any mode change. It would also be essential to evaluate and monitor use levels as well as changes in traffic pollution levels. Such surveillance,

for example, has shown some effectiveness in diverting pan-African Heavy Goods Vehicles (HGVs) outside of cities while traveling between cities. For example, the route from Mombasa's port used to run through Nairobi, but it now bypasses the city for trucks heading to places farther away, such as Uganda.

In addition, a significant infrastructure project in Nairobi is planned: the implementation of a new bus rapid transit (BRT) system. "The NAMA would utilize the current and authorized Government of Kenya-World Bank initiative to improve Highway A104 infrastructure as the "window of opportunity" to include a single route for an eBRT," according to the Nationally Appropriate Mitigation Action (NAMA). The NAMA will contribute to the construction of the Nairobi Metropolitan Region's first BRT line, the Ndovu (elephant) line. Beginning with the building of dedicated bus lanes and continuing through the activation of the eBRT stock in 2018, the NAMA will assist the entire deployment of the BRT system.

1.3 The argument for a comprehensive approach to planning:

It seems that neither infrastructure nor other approaches will be enough to alleviate Nairobi's pollution burden on people and the environment. A more realistic and comprehensive answer would seem to be a set of steps that, over time, undermine automobile dependence and reduce the usage of highly polluting cars while offering clean, sustainable alternative transportation choices. "The World Bank Group has taken measures in recent years to assist So Paulo in developing public transportation infrastructure, including giving over \$1 billion in investment assistance to construct new metro lines. However, worldwide experience indicates that, although better public transportation systems frequently offer viable alternatives to automobiles, additional measures are required to convince many commuters to leave their cars at home.

In 2011, the Bank Group established experimental "Voluntary Corporate Mobility" initiatives in So Paulo and Mexico City to assist businesses and municipalities discover and implement innovative methods to transport employees to and from work. Company-led initiatives to decrease employee commute footprints are known as voluntary corporate mobility programs. Among the most common methods is to encourage individuals to:

- Take public transportation instead of driving a single-occupancy car.
- Travel at off-peak hours.
- You can work from home.
- Invest on non-motorized transportation, such as bicycles.

Single-occupancy vehicle usage is reduced, which lowers pollution and carbon emissions, improves traffic flow, and saves energy." To address the problems of congestion and pollution, policy, law, and active regulation must accompany infrastructure investment. Planning would be better served if it focused less on easing automobile access and movement through the city, as it has in the past. Instead, it should be people-centered and geared on enhancing the social and environmental elements of sustainability while also exploring new avenues for economic development. Life in Kenya's capital will be healthier and happier if current pictures of road space overloaded by fossil fuel burning cars are replaced with images of green space, dedicated walking, cycling, and public transportation facilities, and better ambience. To accomplish this objective for Nairobi, political determination, business sector commitment, and public participation are all required.

2. DISCUSSION

It may be helpful to propose a realistic timetable for change as Nairobi looks for more sustainable ways to transportation. Small victories are likely to be the most successful way for the change

process to obtain local buy-in at first. As a result, the adoption of bike-share and cycling training programs, as well as the introduction of off-road walking routes and the use of paint on roadways to reassign space for pedestrian use (see, for example, Janette Sadik Khan's work in New York), could be the first steps in changing people's perceptions of their streets and cities. Days dedicated to promote more sustainable forms of transportation (such as Ciclovía in Bogotá and Hoy No Circula in Mexico City) may also assist show what the city would look like without motorized traffic. Infrastructure development and transformation may be ongoing in tandem with such activities and interventions. By developing rules for less crowded fleets of public transportation vehicles, the acquisition of low-polluting new buses may be phased in over time, with a 3- to 5-year deadline for all vehicles to satisfy the regulatory requirements.

3. CONCLUSION

Cities experiencing fast urban development are characterized by traffic congestion and pollution. In East Africa, there is recognition of the negative impact of traffic congestion on cities, as well as the fact that it has an impact on productivity, competitiveness, and sustainability. Steps taken in the area to successfully alleviate traffic congestion, on the other hand, seem to be in their infancy.

Nonetheless, Kenya seems to have made some headway toward its Metro 2030 goal, developing a bus rapid transit system and imposing the strictest age restrictions on car imports in East Africa. Another sign of Nairobi's dedication to sustainability is the policy of allocating a fifth of the city's road budget to non-motorized transportation. This legislative commitment, however, must be matched in reality by multi-faceted measures to rebalance traffic on the city's roadways via infrastructural, behavioral, and other interventions to promote active modes and public transportation.

In terms of traffic signal management and junction upgrades, work may start early in the process with a requirements assessment and specification of extra equipment to allow the transition to smoother traffic flows. In the near term, parking policy adjustments may be implemented to enable regulatory instruments to begin passing through the required legislative procedures. The construction of new infrastructure may prove to be the most time-consuming. To enable the commencement of construction and execution, the design and financial elements would need to be prioritized and given strict timelines.

REFERENCES:

1. J. Rembiesa, T. Ruzgas, J. Engblom, and A. Holefors, "The impact of pollution on skin and proper efficacy testing for anti-pollution claims," *Cosmetics*. 2018, doi: 10.3390/cosmetics5010004.
2. F. Rajé, M. Tight, and F. D. Pope, "Traffic pollution: A search for solutions for a city like Nairobi," *Cities*, 2018, doi: 10.1016/j.cities.2018.05.008.
3. T. M. Karlsson, L. Arneborg, G. Broström, B. C. Almroth, L. Gipperth, and M. Hassellöv, "The unaccountability case of plastic pellet pollution," *Mar. Pollut. Bull.*, 2018, doi: 10.1016/j.marpolbul.2018.01.041.
4. Y. Chae and Y. J. An, "Current research trends on plastic pollution and ecological impacts on the soil ecosystem: A review," *Environmental Pollution*. 2018, doi: 10.1016/j.envpol.2018.05.008.
5. T. Bourdrel, M. A. Bind, Y. Béjot, O. Morel, and J. F. Argacha, "Cardiovascular effects of air pollution," *Arch. Cardiovasc. Dis.*, vol. 110, no. 11, pp. 634–642, 2017, doi: 10.1016/j.acvd.2017.05.003.

6. K. Maduna and V. Tomašić, “Air pollution engineering,” *Phys. Sci. Rev.*, vol. 2, no. 12, pp. 1–29, 2017, doi: 10.1515/psr-2016-0122.
7. D. Ierodiakonou *et al.*, “Ambient air pollution,” *J. Allergy Clin. Immunol.*, vol. 137, no. 2, pp. 390–399, 2016, doi: 10.1016/j.jaci.2015.05.028.
8. P. Villarrubia-Gómez, S. E. Cornell, and J. Fabres, “Marine plastic pollution as a planetary boundary threat – The drifting piece in the sustainability puzzle,” *Mar. Policy*, vol. 96, no. August, pp. 213–220, 2018, doi: 10.1016/j.marpol.2017.11.035.
9. K. Aunan, M. H. Hansen, and S. Wang, “Introduction: Air Pollution in China,” *China Q.*, vol. 234, pp. 279–298, 2018, doi: 10.1017/S0305741017001369.
10. P. J. Landrigan *et al.*, “Pollution and children’s health,” *Sci. Total Environ.*, 2019, doi: 10.1016/j.scitotenv.2018.09.375.