

# International Journal of Research in Human Resource Management

E-ISSN: 2663-3361  
P-ISSN: 2663-3213  
IJRHRM 2021; 3(1): 40-43  
Received: 09-01-2021  
Accepted: 12-03-2021

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## Environmental challenge of vehicular pollution in Nigeria: An overview

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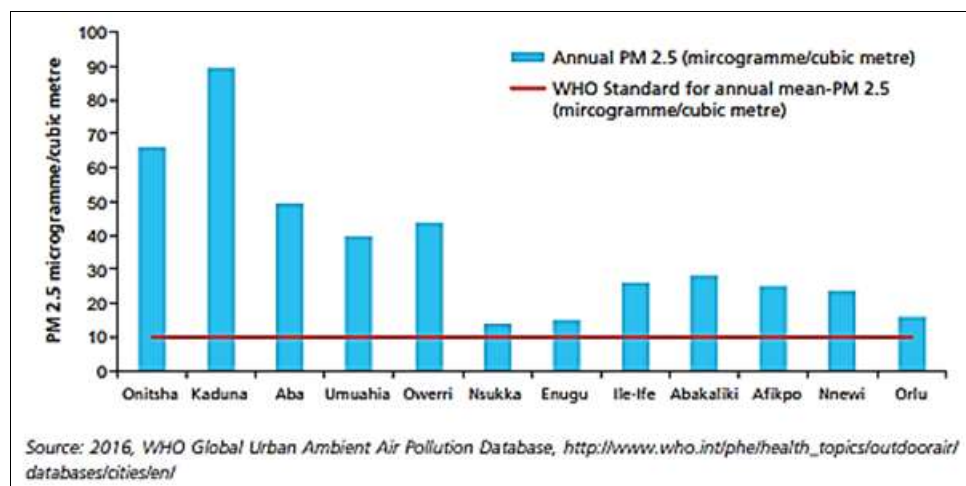
### Abstract

Air pollution is a serious environmental issues all over the globe and it health implication cannot be overemphasized, vehicular pollution in Nigeria is an environmental issues that need urgent attention. The paper review studies on project with increase in pollution with economic growth in Nigeria. The representation of concentration-pathways scenarios projects growth in emission of NO<sub>x</sub> and carbon with growth in the environment, it made use of secondary data from empirical studies on environmental pollution and carbon emission rate in Nigeria and the world at large. The paper discussed vehicular pollution in Nigeria, status of vehicle inspection in Nigeria, towards clean air in Nigerian cities and need for clean fuels and vehicles. In conclusion, there should be adequate framing of pollution source-wise action plan to help cities meet the clean air standards and implementation of vehicle tax.

**Keywords:** Pollution, vehicle, carbon, tax, Nigeria

### 1. Introduction

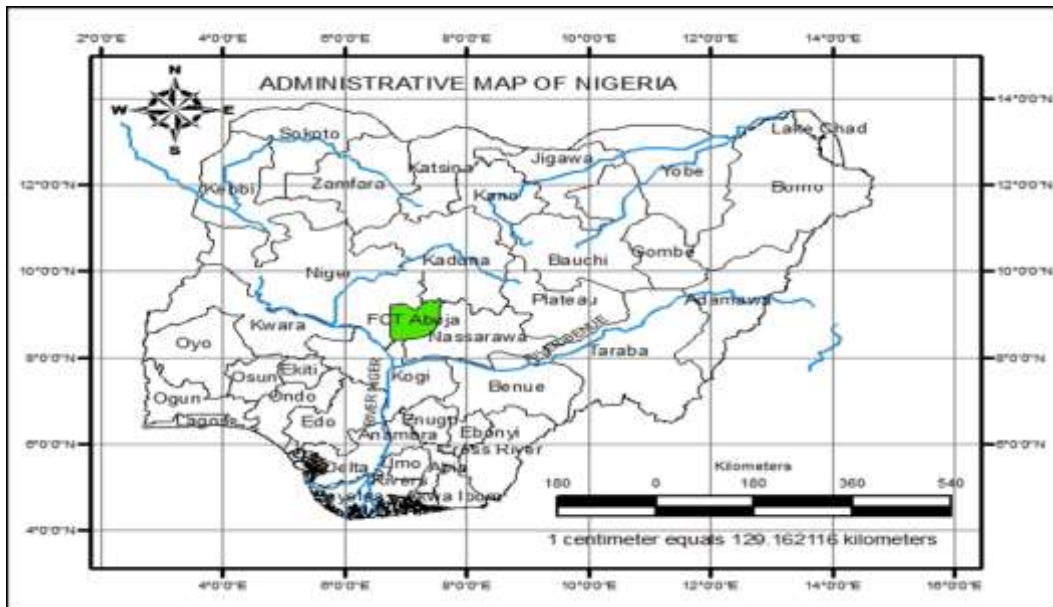
Air pollution data is limited as air quality monitoring is largely absent in Nigerian cities. The World Health Organisation (WHO) has published a database of outdoor air pollution in cities<sup>1</sup> in 2016 which has identified 10 African countries which have started limited monitoring of particulate matter. This shows that though the reported PM<sub>10</sub> levels in most African cities are lower than some of the worst-hit cities in other developing countries such as India, their levels are still much higher than the stringent WHO guidelines. This database shows that all the 12 cities in Nigeria have an annual mean of PM 2.5 above the WHO standard limit



**Fig 1:** PM 2.5 levels in 12 Nigeria cities

Studies have been carried out to project increase in pollution with economic growth in Nigeria. The representation of concentration-pathways scenarios projects growth in emission of NO<sub>x</sub> and ozone with growth. A considerable part of NO<sub>x</sub> comes from the open fires. This with severely restricted ventilation leads to poor ozone levels in central Nigeria. The experience in developing countries shows that air pollution grows at an alarming speed and therefore needs stringent and preventive action at the early stages.

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Source: Abuja geographic information system (AGIS, 2020)

Fig 2: Administrative map of Nigeria

**2. Vehicular pollution in Nigeria**

Nigerian cities are already in grip of rapid motorization. Even with lower baselines, the rate of increase is rapid. The country has about 6 million registered vehicles that are largely concentrated in cities. In 2012, there were about 20 vehicles per 1000 people. About 4, 00,000 vehicles get added every year. Though low, this is expected to increase rapidly because of economic growth and low cost of used-car imports. The average number of cars per middle-class household is estimated to be about 0.8. Around one third of middle-class Nigerians have a car that is less than five years old and 5 per cent of homes have two cars. In Lagos, vehicles contribute about 43 per cent of PM 2.5 and in Abuja, 87 per cent. Studies in the Calabar region of Nigeria found that all the five monitored air pollutants when

compared with air quality index were high. CO was poor to moderate in different locations. SO<sub>2</sub> was very poor to poor; NO<sub>2</sub> was very poor to poor, and PM 10 was poor at all the monitored locations. The International Energy Agency in 2010 has stated that about 25 percent of the Nigeria’s carbon footprint comes from the road transportation alone. In the capital city of Abuja, the rate of motorization is much higher than the population growth. Cities have many sources of outdoor air pollution and all require mitigation action. But vehicles pose a special challenge. Pollution concentration in our breath is three to four times higher than what it is in the ambient air. According to the Health Effects Institute of the US, people residing 500 meters from roads are most exposed to vehicular fumes.



Fig 3: Vehicular pollution in Nigeria

**3. Status of vehicle inspection in Nigeria**

Robust vehicle inspection regime is necessary as most of the vehicles are old and polluting. In Nigeria, vehicle inspection centers have been set up to monitor roadworthiness and emissions from in-use vehicles. The Nigerian government

has made some regulations for the emission from vehicles, i.e. the National Environmental (Control of Vehicular Emissions from Petrol & Diesel Engines) Regulations, 2011. They have also set up the first computerized vehicle-testing centre known as Abuja Computerised Vehicle

Testing Service. The enforcement agencies are unable to fully implement and enforce some existing laws and regulations due to lack of adequate equipment to carry out required tests. Testing of speedometer checks, brake checks, emissions etc. is not adequate. Testing centers are few. There are several emerging good practices in the African region. In Kenya and Ethiopia, annual vehicle inspection is mandatory. The vehicle roadworthiness test is being conducted with upgraded machines to measure exhaust emissions against the standard set by the Authority. In Rwanda, the National Police and Rwanda Environment Management Authority have implemented vehicle emission testing programme. All vehicles have to undergo emissions inspection. Norms for roadworthiness and emissions have been adopted. Commercial vehicles undergo a test every six months. Private vehicles also have to get tested every year. Traffic police can ask for impromptu emission testing for any grossly polluting vehicle. If a vehicle fails it is impounded or pays high monetary penalty. Cross-learning from all these programmes are important for designing a robust system as all these markets have similar fleet and technology genre. However, compliance and enforcement are serious challenges. Specific tools will have to be designed to ensure compliance. For instance, in India there is a proposal to link and mandate annual vehicle insurance with emission tests to ensure everyone complies with the rules. These programmes will have to be scaled up. Given the fact that setting up of adequate numbers of vehicle testing centers is time- and resource-intensive, other supportive and low-cost compliance strategies can also be rolled out. These include on road smoky vehicle check in which visible inspection is carried out and smoky vehicles are penalized and sent for tests.

#### 4. Towards clean air in Nigerian cities

Vehicular fumes are also extremely toxic. The toxicity of the fumes is aggravated by the rapid increase in the use of diesel in cars and expansion of freight traffic. In June 2012, WHO reclassified diesel emissions as a Class I carcinogen by putting it in the same bracket as tobacco smoking for its strong link with lung cancer. Diesel also has short-term respiratory and cardiac effects. International studies, including one carried out in London, show diesel emissions have worsened the lung function in people with asthma. The Lagos Metropolitan Area Transport Authority in 2005 initiated a 14-month air quality monitoring study. The results of the study confirmed that transport is the major cause of air pollution in the city. Another EIA study carried out by Mechelec Construction (Nigeria) in 1996 on behalf of the Lagos Urban Transport Project (LUTP) revealed that the road traffic is the major source of air pollution in the city. Nigerians spend a whopping 4 billion Naira to fuel their vehicles on a daily basis, which costs about 35 per cent of individual income, while vehicular emissions account for about 50 per cent of Nigerian contribution to global CO<sub>2</sub> emissions annually.

#### 5. Need for clean fuels and vehicles

Clean fuel is the critical first step to bring more advanced vehicle technology and reduce emissions. This process has started in the African region. In 2002, no country in Africa had 50 ppm sulphur diesel. Since January 2015, Kenya, Uganda, Rwanda, Burundi and Tanzania have moved to 50 ppm sulphur fuel within East Africa. South Africa and

Nigeria have implemented the Euro II emissions standards for vehicles. South Africa has passed the regulation to implement 10 ppm by 2017. Morocco, Tunisia and Mauritius have met the 50 ppm or below target. Kenya and Rwanda have also met the 50 ppm diesel fuel sulphur target from January 2015. In Nigeria, diesel fuel has 3000 ppm sulphur and petrol has 1000 ppm sulphur. As a result, improved vehicle emissions standards of Euro II cannot be enforced. According to the estimates available from International Council on Clean Transportation, Nigeria imports 70 per cent of its fuels to meet their national demand. Their four refineries cannot meet the domestic energy need.

#### 6. Conclusion

Development of a detailed guidance framework for National Air Quality management Policy based on multi- stakeholder consultation, technical assessment and sharing of global best practices is very important. This will enable further framing of pollution source-wise action plan to help cities meet the clean air standards. Implementation of vehicle tax.

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