



Urban air pollution in Sub-Saharan Africa: Time for action[☆]

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ABSTRACT

Air quality in cities of Sub-Saharan African (SSA) countries has deteriorated with the situation driven by rapid population growth and its attendant increased vehicle ownership, increased use of solid fuels for cooking and heating, and poor waste management practices. Industrial expansion in these cities is also a major contributor to the worsening air pollution. Exposure to ambient air pollution is a major threat to human health in SSA with 176,000 deaths and 626,000 DALYs in the region attributable to ambient air pollution exposure. These estimates are however likely to be much higher than reported due to the limited data emanating from the region. Recently, the adoption of the World Health Assembly resolution on air pollution and health, and Sustainable Development Goals are a welcome boost for urban air pollution control efforts in SSA. In this article, we have outlined within the broad framework of these international policy instruments, measures for addressing urban air pollution and its associated health impacts in SSA sustainably.

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1. Introduction

Air quality in sub-Saharan African (SSA) cities has deteriorated owing to rapid population growth and industrial expansion in these areas. Some of the highest fine particles levels in the world have been recorded in cities of SSA and other developing regions (Brauer et al., 2012). PM_{2.5} concentrations in SSA cities has been estimated at around 100 µg/m³ compared to <20 µg/m³ in most European and North American cities (Brauer et al., 2012). Rapid population growth in SSA cities has led to increased vehicle ownership, increased use of solid fuels for cooking and heating, and poor waste management practices. This situation together with increased industrial emissions and unpaved roads in several neighborhoods are the sources of urban air pollution in SSA. Exposure to ambient air pollution (AAP) is a major threat to human health in SSA with WHO attributing 176,000 deaths in the region to AAP exposure in 2012 (WHO, 2014). Chafe et al. (2014) also attributed 626,000 DALYs to ambient PM_{2.5} exposure in 2010. These estimates are very likely to be much higher than reported due to the limited air pollution epidemiological data emanating from the region. Health endpoints

causally linked to AAP exposure including cardiovascular and cardiopulmonary diseases, lung cancer and respiratory infections have also been noted to be rising in the region (Mbewu and Mbanya, 2006; WHO, 2013; Parkin et al., 2008; Dalal et al., 2011). According to Akumu (2016), the cost of air pollution in African cities could be as high as 2.7% of GDP.

The Sixty-eighth World Health Assembly (WHA) adopted a resolution to tackle air pollution and associated health impacts, proposing 14 measures that member states should strive to implement in this direction. The measures include empowering health authorities to raise awareness of the health impacts of air pollution, establishing air quality monitoring networks and developing guidelines to minimize exposures, mounting surveillance and conducting research on air pollution related illnesses, promoting cleaning cooking and heating solutions, and seeking technical and financial assistance from regional and international development partners to improve air quality. The resolution also urges the World Health Organization (WHO) to assist member states in the implementation of the measures proposed by strengthening the capacity of its regional and country offices in the area of air pollution and health to enable them provide strong technical support and guidance. The United Nations General Assembly also recently adopted the post-2015 development agenda with improvement in air quality captured as a target for implementation of 4 of the 17 Sustainable Development Goals (SDGs) adopted (see Table 1).

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Table 1

Air quality targets of the sustainable development goals (SDGs) and proposed actions for achieving the targets.

SDG ^a	Air quality target ^a	Proposed actions
3: Ensure healthy lives and promote well-being for all at all ages	3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	<ul style="list-style-type: none"> • Strengthening countries capacities in air quality monitoring • Raising awareness of air pollution and surveillance of air pollution-related illnesses • Seeking technical assistance for developing air quality management systems • Promotion and dissemination of clean cooking solutions
9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	<ul style="list-style-type: none"> • Curbing industrial expansion in cities • Set higher emission standards for factories such as installation of scrubbers • Prohibit the importation of obsolete technologies
11: Make cities and human settlements inclusive, safe, resilient and sustainable	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	<ul style="list-style-type: none"> • Seeking financial assistance for easing vehicular traffic congestion • Outlawing importation of over-aged vehicles and promotion of non-motorized transport • Ensuring sound waste management practices • Community mobilization for development of urban neighborhood roads
12: Ensure sustainable consumption and production patterns	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	<ul style="list-style-type: none"> • Ensuring sound waste management practices

^a Source: United Nations (2015).

There is a clear lack of urgency from SSA governments in addressing the worsening urban air quality situation in the region possibly owing to the absence of (1) reliable data on air pollution levels due to weak and non-existent air quality monitoring networks in countries, and (2) local evidence on the environmental and human health impact of air pollution, and the magnitude of the associated health risk. The WHA resolution and SDGs are therefore a welcome boost for urban air pollution control efforts in the region and in this commentary, we have outlined within the broad framework of these international policy instruments, measures for addressing urban air pollution and its associated health impacts in SSA sustainably.

1.1. Strengthening countries capacities in air quality monitoring

Air quality monitoring (AQM) is patchy in many SSA cities, and in countries where monitoring networks existed in the past, these networks broke down after a short period of existence (Schwela, 2007). A recent review of studies monitoring particulate air pollution in urban areas of Africa also did indicate that routine AQM is limited across Africa with many countries lacking air quality standards (Petkova et al., 2013). Strengthening AQM in SSA will provide data for (a) developing a national response to the air pollution problem and (b) health impact assessment to reduce the burden of disease attributable to air pollution, and for communicating risk.

In 2004, the United States Environmental Protection Agency (US EPA), USAID and United Nations Environment Program (UNEP) selected Accra, the capital of Ghana as one of two cities in SSA to benefit from an AQM Capacity Building Project with the goal of building local capacity in AQM in order to provide policy makers with information on air quality and associated health impacts. The Accra program is well managed and has made remarkable progress since its establishment. Accra presently has 14 monitoring stations covering roadside, commercial, industrial and residential areas with another station recently established at Tema, an adjoining metropolis and part of the Greater Accra Metropolitan Area. According to the Ghana EPA, plans are underway to expand the program by reinstating 3 historical sites and establishing a further 21

roadside (at 4 km interval, 7 along two major BRT corridors), 1 commercial and 9 residential air monitoring sites with an implementation time frame of 10 years (Apoh, 2015). Presently, the Accra program follows a 6-day monitoring cycle but again according to the Ghana EPA there are plans to establish 3 continuous daily monitoring stations for health impact assessment in collaboration with the Ghana Health Service and for estimating air pollution-related healthcare cost by linking with the National Health Insurance Scheme (Apoh, 2015). Once these initiatives are fully implemented, it is expected to generate stronger evidence for action on air pollution.

South Africa is the only country in the region with a very comprehensive and well organized AQM program. The South African program together with the rapidly evolving Accra program should serve as models for strengthening the numerous weak programs in the region or for replication in countries where AQM networks do not exist. Program staff of countries and technical staff of ministries/agencies responsible for maintaining air quality standards should be encouraged to visit these two model countries to understand the implementation process and learn their best practices. Also, global and regional air quality management meetings and workshops should at every opportunity invite these two countries to share their experiences and lessons learnt from implementation for broad dissemination.

1.2. Seeking technical assistance for developing air quality management systems

The Clean Air Initiative in Sub-Saharan Africa (CAI-SSA) and the Air Pollution Information Network for Africa (APINA) were launched by the World Bank and the Stockholm Environment Institute, respectively, in the late 90s in response to the deteriorating air quality situation in the region. Countries should approach these regional bodies for technical assistance in developing air quality management systems. APINA for instance played a leading role in the development and promulgation of regional framework agreements on air pollution. These agreements are however yet to translate into actions in many signature countries and should engage the attention of APINA. Countries should also approach the

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