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Middle Eastern Cities in a Time of Climate Crisis

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Air Pollution and Climate Change: Two Sides of the Same Coin

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AIR POLLUTION AND CLIMATE CHANGE: TWO SIDES OF THE SAME COIN

INTRODUCTION

This chapter is about climate change and sustainable cities. Its title is 'air pollution and climate change' because air pollution and climate change are two sides of the same coin. They have the same source, namely the burning of fossil fuels, whether in transportation, in factories, to heat homes or for any other activities which use fossil fuels as sources of energy. The majority of these activities is concentrated in cities.

The burning of fossil fuels emits not only carbon dioxide and other greenhouse gases (GHGs) but also other contaminants and hazardous substances that pollute the air we breathe. These include sulphur, nitrogen oxide, ozone, carbon dioxide, minerals and, most importantly, particulate matter, or PM.

PM is composed of a combination of different kinds of pollutant gases, droplets, minerals, dust etc. The chemical composition of particles differs according to type of fuel, activity and location. PM is very harmful to human health, and the smaller its size, the more

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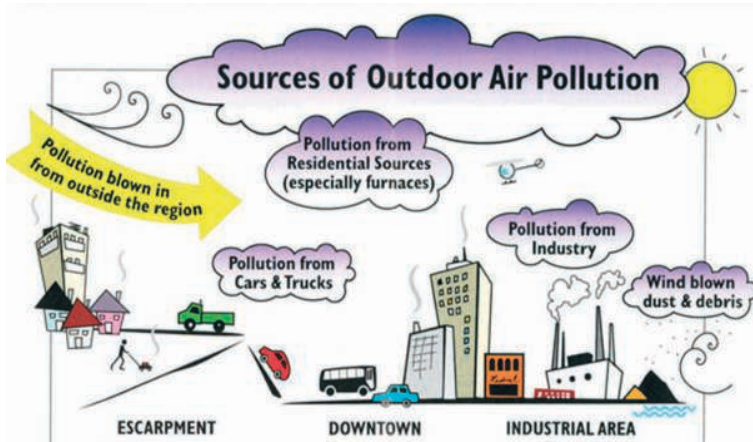


Figure 1. Sources of outdoor air pollution. Source: Clean Air Hamilton (<https://cleanairhamilton.ca/sources/>).

harmful it is. Small particles inhaled from the air can penetrate the body and affect different organs. Air pollution can cause a variety of diseases, from simple inflammation to cancer.

The way most cities are built – with tall buildings, busy centres, narrow streets, high population densities and rare green and open areas – increases the health burden of air pollution. According to the World Health Organization, outdoor air pollution is responsible for more than three million early deaths every year; the majority in developing countries (WHO 2016).

Cairo is a megacity, with more than twenty million inhabitants. It is a very compact, busy city with traffic congestion, few green areas or open spaces and many industries. A few years ago, Cairo was the second most-polluted city in the world, according to the WHO (2016). In 2015, the average concentration of particulate matter ($PM_{2.5}$) in the air was $80 \mu\text{g}/\text{m}^3$, while the level recommended by the WHO is $5 \mu\text{g}/\text{m}^3$ (WHO 2021).

Alexandria, the second largest city in Egypt, is very vulnerable to climate change too, both because of its location on the north coast and because of its high levels of pollution. It hosts about 40 per cent of Egypt's industries and, with ten industrial zones and their economic activities, the city's production heavily relies on fossil fuels.

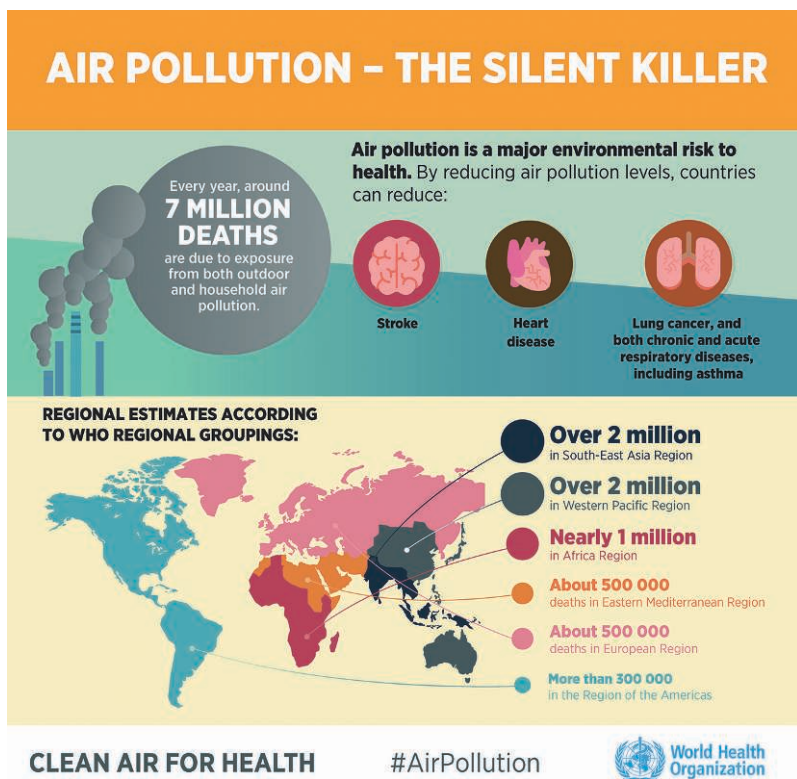


Figure 2. Air pollution, the silent killer. Source: World Health Organization (https://www.who.int/thailand/health-topics/air-pollution#tab=tab_1).

MITIGATING CLIMATE CHANGE

Some may say that Egypt is not responsible for most emissions, since it produces only 0.6 per cent of global emissions. Moreover, they say, Egypt is not historically responsible, so it should not make an effort to decrease fossil fuel consumption (mitigation), especially because it needs to grow and create economic prosperity.

In reality, however, Egypt will hugely benefit from reducing its fossil fuel consumption and shifting to cleaner fuel. This will not only decrease GHG emissions but also air pollution, which hits the country hard. The economic and health costs of air pollution are very high. In 2016, the number of early deaths from air pollution was 60,000,



Figure 3. Smog over Cairo. Source: Egyptian Streets blog (<https://egyptianstreets.com/2018/03/24/cairos-environmental-crisis-tips-for-the-average-cairene-to-tackle-air-pollution/>).

reaching 90,000 in 2019, with a cost of 2.8 per cent of GDP for the economy (Larsen 2019; WHO 2016).

Compared to other countries undergoing the same level of economic growth, Egypt ranks high on emissions, which translates into a high burden for public health and natural resources. Egypt needs renewable energy, and it can be more efficient in using its fuels and quicker in its transition to renewable energy. This will directly benefit Egypt as well as the world as a whole.

WHAT NEEDS TO BE DONE

Much good work has been done to mitigate climate change in Egypt and hence decrease air pollution. Projects have included increasing the share of renewable energy in power generation, encouraging the use of LED for lighting, introducing electric buses, replacing old taxis with more efficient cars and encouraging the use of natural gas

by cars, improving efficiency in production and consumption, and improving roads.

However, many projects contradict each other, and good effects achieved by one project can be undermined by another. For example, huge projects undertaken to improve roads were mainly carried out without simultaneously improving public transportation, creating bike lanes or considering the urban and pedestrian needs of the city. Meanwhile, many trees and green areas, already rare in Cairo, were removed for the sake of widening these roads. Another example consists of projects to improve the industrial efficiency of fuel consumption: the benefits of these new forms of production are reduced by the construction of new industries that heavily consume fossil fuels, such as cement (in spite of an oversupply). Reclaiming land for agriculture also consumes a lot of water, while changing the wasteful irrigation system used in old lands may give better results.

There are many examples. We may conclude that there are efforts in the right direction, but we still need an inclusive strategy or vision to mainstream the environmental and social dimensions together with the economic one in all economic projects in order to accomplish sustainable development, mitigate climate change and improve the health of the population.

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