



Air Pollution and Development in Africa: Impacts on Health, the Economy and Human Capital



**BOSTON
COLLEGE**



UNIVERSITY OF
Global Health
EQUITY



UNEP promotes environmentally sound practices globally and in its own activities. Our distribution policy aims to reduce UNEP carbon footprint.

Air Pollution and Development in Africa:

Impacts on Health, the Economy
and Human Capital

Air Pollution and Development in Africa: Impacts on Health, the Economy, and Human Capital. © UNEP, 2021. All rights reserved.

Published in 2021 by the United Nations Environment Programme

United Nations Environment Programme

United Nations Avenue, Gigiri

PO BOX 30552, 00100

Nairobi, Kenya

Email: unep-newsdesk@un.org

REPORT DIRECTORS

Philip Landrigan, Director, Global Observatory on Pollution and Health, Boston College, Boston

Pushpam Kumar, Chief Environmental Economist, United Nations Environment Programme, Nairobi

AUTHORS

Samantha Fisher, MPH, Boston College, fishersn@bc.edu; (209)814-0559

David C. Bellinger, PhD, Boston Children's Hospital/Harvard Medical School,

david.bellinger@childrens.harvard.edu

Maureen L. Cropper, PhD, University of Maryland, mcropper@umd.edu

Pushpam Kumar, PhD, United Nations Environment Programme (UNEP), pushpam.kumar@un.org

Agnes Binagwaho, MD, University of Global Health Equity, Rwanda abinagwaho@ughe.org

Juliette Biao Koudenoukpo, PhD, United Nations Environment Programme (UNEP), – Africa Office,

juliette.biao@un.org

Yongjoon Park, PhD, University of Massachusetts Amherst, yongjoonpark@umass.edu

Gabriella Taghian, BA, Boston College, gabriella.taghian@gmail.com

Philip J. Landrigan, MD, Boston College, phil.landrigan@bc.edu

Cover photo credit: Eric Lafforgue / Hans Lucas and Axel Drainville, Flickr

Author Contributions

- SF Data analysis related to the burden of disease. Data interpretation. Literature review. Creation of figures. Verified the integrity of the underlying data. Lead role in the writing of the report.
- DB Study design and all calculations related to IQ exposure-response function. Data interpretation. Contributed significantly to the writing of the report.
- MC All calculations related to the economic and human capital impacts of air pollution in Africa. Data interpretation. Contributed significantly to the writing of the report.
- PK Data interpretation. Contributed significantly to the writing of the report.
- AB Data interpretation. Contributed significantly to the writing of the report.
- JB Data interpretation. Contributed significantly to the writing of the report.
- YP Calculations related to the economic and human capital impacts of air pollution in Africa. Data interpretation.
- GT Literature review and collecting background information. Creation of figures. Also contributed significantly to the writing of the report.
- PL Data interpretation. Verified the integrity of the underlying data. Contributed significantly to the writing of the report.

Conflict of Interest Statements

No potential conflict of interest was reported by any of the authors.

Technical Editors

Samantha Fisher, Global Observatory on Pollution and Health, Boston College

Amelia Holmes, United Nations Environment Programme, Nairobi

Key Words

Cognitive function; Economic development; Epidemiologic transition; Global Burden of Disease; IQ loss; Non-Communicable Diseases (NCDs); Prevention; Ambient Air Pollution; Energy transition; Ethiopia; GDP; Ghana; Household Air Pollution; Pollution-related disease; Rwanda; Sustainable Development Goals (SDGs).

Table of contents

Key Words	2
REPORT DIRECTORS:	2
AUTHORS:	2
Author Contributions	3
Conflict of Interest Statements	3
Technical Editors:	3
Foreword	6
Executive Summary	8
Methods	8
Findings.....	8
Discussion	8
Introduction	10
Methods	12
Estimation of Morbidity and Mortality due to Air Pollution.....	12
Estimation of Losses in Economic Output Due to Air-Pollution-Related Morbidity and Mortality	12
Estimation of IQ Loss due to Air Pollution.....	12
Findings	13
Air Pollution in Africa	13
Disease and Death Attributable to Air Pollution in Africa	13
Loss of Economic Output Due to Air-Pollution-Related Morbidity.....	15
Loss of Human Capital Due to Air-Pollution-Related Mortality	15
Air Pollution and IQ Loss in African Children	16
Discussion	18
Limitations in the study	19
Recommendations	20
References	23

Supplementary Appendix	26
I. Measurement of Losses in Economic Output due to Air Pollution in Africa	26
II. Air Pollution in Africa	30
III. Morbidity and Mortality Attributable to Air Pollution in Africa.....	31
IV. The Intersection of Air Pollution with Economic Development - Ethiopia, Ghana and Rwanda.	31
V. Measurement of IQ Losses Due to Air Pollution in African Children.....	35
Methods	35
Results.....	35
References	40

Foreword

For the last twenty years, Africa's growth has been accelerating. Before the coronavirus outbreak, the continent was on track to more than triple its population this century while making enormous gains in health. Life expectancy has been increasing and infant mortality declining, and deaths from communicable diseases, including malaria and AIDS, are on the decline.

However, even without the ongoing pandemic, the continent is facing challenges. Ambient air pollution is lower than in many other parts of the world but is already contributing to an increasing number of deaths, including from pneumonia, heart disease, stroke, diabetes, chronic lung disease, and lung cancer. The burning of fossil fuels – coal, oil and gas – to drive economic growth lies behind the increasing morbidity.

But there is another way.

This is the main message of the study, "Air Pollution and Development in Africa: Impacts on Health, the Economy and Human Capital" which assesses the impacts of ambient air pollution on health and the economy in African countries, now and in the future. Using data from the World Health Organization and the Institute for Health Metrics and Evaluation, this report will help leaders of African countries understand the full health and economic implications of various pathways to economic growth and development.

First, the report looked at the contribution of air pollution to disease and death. As families across Africa move away from traditional biomass fuels such as wood and charcoal to liquefied petroleum gas and non-polluting renewables such as wind and solar, household air pollution is declining. But at the same time, industrialization and economic growth mean ambient pollution is increasing. In 2019, it was responsible for an estimated 383, 419 deaths across Africa.

The report also finds that ambient pollution caused by fossil fuels has clear economic downsides. In Ethiopia, Ghana and Rwanda, disease and death caused by ambient air pollution result in substantial annually recurring losses in economic production of between 0.08 and 0.3 per cent of gross domestic product.

预览已结束，完整报告链接和二维码

<https://www.yunbaogao.cn/report/index/report?re>