

Ethiopia: Information sheet on climate change, air pollution, and health

Climate change and air pollution are closely related and pose significant risks to human health, environments, and economies. Climate change directly harms health while also impacting social and environmental determinants of health – clean air, safe drinking water, secure and sufficient food, housing, education and livelihoods. Greenhouse gases (GHGs), air pollution, and black carbon emitted from energy, industry, transport, household, agricultural, and waste management sectors harm both environment and population health. Countries have a unique opportunity to improve the environment, population health and wellbeing by integrating meaningful health and air pollution mitigation activities into Nationally Determined Contributions (NDCs). This info sheet provides an overview of some of the main health impacts of climate change in Ethiopia to help shape adaptation plans while also identifying opportunities to reduce GHG emissions and air pollution – and thus promote public health.

Ambient air pollution from human activities was responsible for close to 27,300 deaths from particulate air pollution ($PM_{2.5}$) in Ethiopia in 2021 [1]. Of these deaths, 12 percent came from fossil fuel burning and a staggering 64 percent from biomass burning (Figure 1) [1]. The estimated economic value of these premature deaths was approximately US\$2.6 billion [1]. In addition to outdoor air pollution, household (indoor) air pollution also posed a major threat. Based on findings from a [UNDP air pollution investment case for Ethiopia](#), household air pollution was responsible for nearly 39,000 deaths and over 800,000 chronic disease cases, carrying an estimated economic burden of US\$8 billion [2]. Most of these deaths can be prevented by shifting to renewable energy sources that avoid the combustion of fossil fuels and biomass, while reducing GHG emissions. The World Health Organization (WHO) reports for Sustainable Development Goal Indicator 3.9.1 (Mortality from air pollution) that deaths attributable to ambient air pollution in Ethiopia represent 11 percent of chronic obstructive pulmonary disease, 20 percent of Ischemic heart disease, 12 percent of ischemic stroke, and 7 percent of lung cancer deaths [3].

ETHIOPIA'S ENGAGEMENT ON CLIMATE CHANGE, AIR POLLUTION, AND HEALTH

Ethiopia's National Adaptation Plan (NAP) includes an option of "improving human health systems through the integration of changes based on an integrated health and environmental surveillance protocol," and notes that improving indoor air pollution will receive further emphasis [4]. Article 44 of Ethiopia's Constitution guarantees that "all

citizens have right to a clean and healthy environment," and Article 89 "emphasizes the government's commitment to safeguard and enhance health" [5]. Realizing these targets requires enhanced national air quality proclamations with clear and enforceable public health provisions, which the UNDP's Multi-Sectoral Action Plan on Air Pollution and

Health 2025-2030 identifies as essential to Ethiopia mitigating adverse health effects and socio-economic impacts from air pollution [6]. Its second NDC includes multiple references to health and discusses clean cooking [7], and Ethiopia demonstrates this commitment as a partner country of the Clean Cooking Alliance [8]. Ethiopia has endorsed meaningful action to reduce short-lived climate pollutants including methane, black carbon, and hydrofluorocarbons, joining the Climate and Clean Air Coalition (CCAC) in 2012 [9], and the Global Methane Pledge (GMP) in 2021 [10]. Ethiopia committed to build a climate-resilient health system by joining the Alliance for Transformative Action on Climate and Health

(ATACH) [11]. In addition, Ethiopia endorsed the *COP28 Declaration on Climate and Health, in which countries committed to “take health into account, as appropriate, in designing the next round of Nationally Determined Contributions...”*[12]. Ethiopia has adopted Long Term Low Emissions Development Strategies (LT-LEDS) targeting energy, transport, agriculture, forestry, and waste management sectors [13]. These policy objectives can be further strengthened in Ethiopia’s third NDC. These policy objectives can be further strengthened in Ethiopia’s third NDC, providing benefits for public health, wellbeing, development, and the economy.

SOURCES OF HEALTH-HARMING AIR POLLUTANTS IN ETHIOPIA

Particulate matter (PM) or particle pollution is a mixture of airborne solid particles and liquid droplets. Out of these, PM_{2.5} (inhalable particles 2.5 micrometres or smaller in diameter) are particularly harmful to health, increasing the risk of heart, cardiovascular, lung, and neurological disease, and cancer, amongst others. Black carbon, or soot, is a powerful pollutant and a short-lived climate pollutant (SLCP, also known as super pollutants). Methane (CH₄) is a GHG, a SLCP, and a major contributor to ground level ozone – which has powerful impact on both human health and climate change. Polluting emissions

share the same general sources as GHG emissions – namely energy / power, transport, industry, and waste sector combustion, and agriculture. While the greatest source of PM_{2.5} in Ethiopia is windblown dust, the leading anthropogenic sector sources of PM_{2.5} are residential buildings, energy, industry, and transport [14]; while the lead sector sources of black carbon include windblown dust, buildings, industry, and transport; and the leading sector sources of methane are agriculture, waste, buildings, energy, transport, and industry [15] (Table 1).

Table 1: Ethiopia sector sources of PM_{2.5}, Black Carbon, and Methane

PM _{2.5} (source: State of Global Air [9])		Black Carbon (source: Community Emissions Data Systems [10])		Methane (source: Community Emissions Data Systems [10])	
*Windblown dust	38.3 %	Buildings	87.8 %	Agriculture	70.8 %
Residential buildings	22.0 %	Transport	7.4 %	Waste	15.6 %
Energy	10.1 %	Waste	1.9 %	Buildings	10.3 %
Industry	4.5 %	Industry	1.7 %	Energy	3.3 %
Transport	3.3 %	Agriculture	.56 %	Transport	.02 %
Agriculture	.9 %	Energy	.49 %	Industry	.01 %



Sources: State of Global Air 2024 [14]; Community Emissions Data System for Historical Emissions 2024 [15]. *Note – not anthropogenic.

POTENTIAL FOR HEALTH BENEFITS RESULTING FROM MITIGATION IN ETHIOPIA

Climate change mitigation efforts could provide major opportunities for the health of local populations in Ethiopia. By targeting leading sources of GHG emissions, and reducing PM_{2.5}, black carbon, methane, and other super pollutants, Ethiopia can achieve near-term climate gains while improving its air quality, public health, and the economy. Strengthening the links between climate and GHG mitigation policy, and air pollution and health objectives, including through Ethiopia's third NDC, could help shape policy and plans that save thousands of lives, promote healthier populations, improve well-being, and boost productivity.

These targeted actions to reduce emissions can lead to substantial health benefits:

- **Avoiding death and disease associated with human-caused air pollution:**

In addition to helping reduce climate change-related threats to people's health and wellbeing, interventions to reduce the use of dirty fuels would have major benefits to people's health. Replacing dirty fuels with clean renewable energy sources, as well as increasing energy efficiency, can significantly reduce exposure to air pollution, which increases the risk of asthma, respiratory infections, cardiovascular disease, cancer, dementia, and many other adverse health outcomes. If supported through adequate

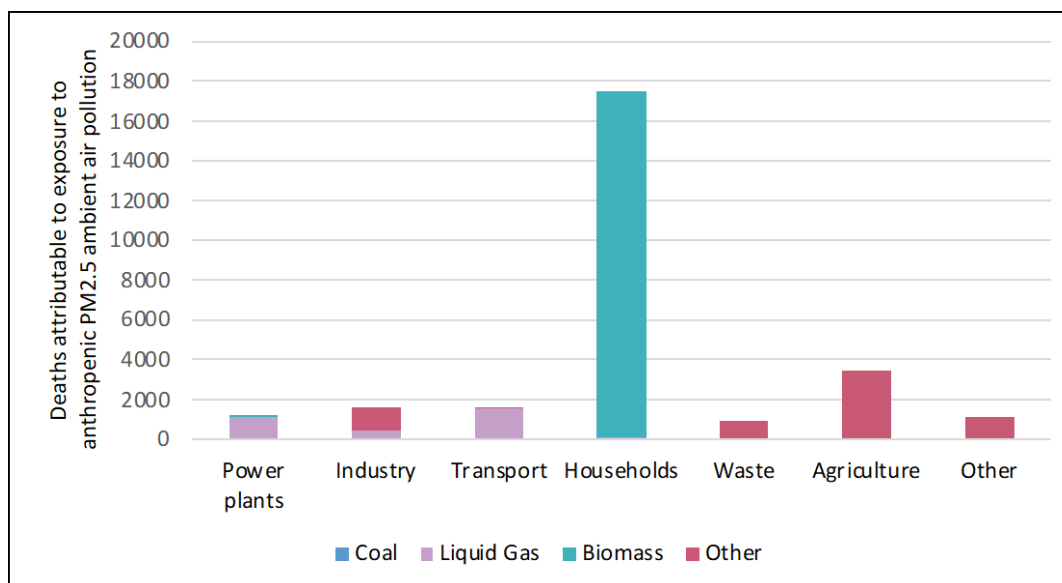
technology transfer, capacity building, and finance, the deployment of clean renewables can also help reduce energy poverty, providing clean fuel sources in remote locations.

- **Sectors with the highest potential to save lives from improved air quality:**

Household sector: With 98.5 percent of its household energy supply coming from biomass and fossil fuels, Ethiopia has the opportunity to prevent each year over 17,500 deaths caused by exposure to household-derived outdoor air pollution, by promoting the transition to clean renewable energies in the household sector [1]. In addition to this, interventions in the household sector can also help avoid thousands more deaths coming from exposure to air pollution inside people's homes.

Transport sector: Air pollution from the use of fossil fuels in the transport sector was responsible for close to 1,600 deaths in 2021 [1]. With close to 100 percent of road transport supplied by fossil fuels, these deaths could be prevented by transitioning to zero-emissions transport systems, including by promoting the use of zero-emission public transport, electric vehicles, and active travel [1]. Active travel, in turn, can have major health benefits by increasing physical activity.

Figure 1: Deaths attributable to exposure to anthropogenic PM2.5 ambient air pollution in Ethiopia by sector and source of emissions in 2021



Source: *The 2024 Report of the Lancet Countdown on Health and Climate Change* [1].

HEALTH IMPACTS OF CLIMATE CHANGE AND NEEDS FOR ADAPTATION IN ETHIOPIA

People in Ethiopia face growing threats to their health and wellbeing due to climate change. Complementing mitigation efforts, adequate adaptation measures can help address these threats and save thousands of lives every year. Including these opportunities in Ethiopia's NDC and National Adaptation Plan offers a unique opportunity to build resilience and protect communities.

- **Health impacts from heat exposure:**

As temperatures rise, populations in Ethiopia face growing risks of disease and mortality associated with heat exposure. Elderly populations, those with underlying chronic health conditions (including cardiovascular disease, heart disease, diabetes), and very young children are most at risk. From 2014-2023, the total number of heatwave days experienced by infants under the age of one and adults over the age of 65 in Ethiopia were nearly 450 percent and over 540 percent

higher than annual averages from 1986-2005 [1].

Rising temperatures and aging populations resulted in a nearly 107 percent increase in average annual heat-related deaths among adults over 65 from 1990-1999 to 2014-2023 [1]. Without climate change, the increase would have been just 22 percent (driven mostly by a growth in the size of the over-65 population), showing how much rising temperatures have worsened heat-related mortality [1].

- **Labour productivity loss due to heat exposure:**

Beyond presenting a direct risk to health, exposure of workers to high temperatures also reduces labour productivity, as workers' capacity to do physical labour decreases, and they need to take more breaks. In the period between 2014 and 2023, heat exposure of local workers caused the loss of over 1.8



billion potential labour hours annually on average in Ethiopia – twice the loss of potential labour hours due to heat exposure from the 1990s [1]. This translates to an estimated US\$562 million in potential income lost annually due to heat exposure between 2014 and 2023, with the agricultural sector bearing 85 percent of the total impact, respectively (losing approximately US\$480 million) [1].

- **Drought and extreme weather impacts:**

Climate change is changing precipitation patterns and, alongside increased incidence of extreme heat events, is increasing incidence of droughts. Droughts have multiple

and pervasive impacts on health, including by threatening crop yields, undermining food security, water security and sanitation, increasing the risk of malnutrition, promoting the transmission of infectious diseases, and causing erosion. The latter, in turn, causes an increase in exposure to dust, which can cause harms on respiratory health, and increase the risk of soil-borne disease transmission. From 2019 to 2023, 61 percent of Ethiopia's land area experienced increasing extreme droughts for at least 1 month on average per year, 46 percent for at least 3 months, and 26 percent for at least 6 months [1]. Additionally, in the period between 2018 and 2022, approximately 85 percent of the population experienced sand and dust storms [1].



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ABOUT THIS REPORT

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ABOUT THE LANCET COUNTDOWN

The Lancet Countdown: Tracking Progress on Health and Climate Change is an international research collaboration tracking the world's response to climate change, and the health benefits that emerge from this transition. The Lancet Countdown was established in partnership with Wellcome, which continues to provide core financial support. Based at University College London (UCL), it brings together over 300 researchers from academic institutions and United Nations (UN) agencies and publishes its findings annually in The Lancet journal ahead of the UN Climate Change Conference.

The data in this report can be explored in further detail in the [Lancet Countdown's Data Platform](#). For more information, including previous annual reports, visit www.lancetcountdown.org.

ABOUT UNDP

The United Nations Development Programme (UNDP) is the United Nations' lead agency on international development. We support countries and communities as they work to eradicate poverty, implement the Paris Agreement on climate change and achieve the Sustainable Development Goals. We advocate for transformative change and connect countries to the resources they need to help people build a better life. Working with a broad network of experts and partners in 170 countries, UNDP helps nations to build integrated, lasting solutions for people and planet. Learn more at undp.org or follow at @UNDP.

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The World Health Organization (WHO) is the United Nations' specialized agency on health, produces evidence-based knowledge, norms and guidelines on various environmental health topics, steers research and monitor health risks, including through Sustainable Development Goals Indicators. WHO promotes primary prevention and supports countries to ensure healthy environments for all and a just and inclusive, clean and sustainable energy transition through cross-sectoral collaboration by integrating health considerations across relevant sectors and international processes to leverage co-benefits and cost reductions while addressing climate change. Learn more at who.int or follow at @WHO.

ABOUT GCHA

The Global Climate and Health Alliance (GCHA) unites and mobilizes the health community worldwide and accelerates climate action to protect and improve health for all. With 200+ organizational members, from every region and reaching over 125 countries, we work at the frontline of a global movement of health professionals and health and development organizations dedicated to promoting a healthy, equitable, and sustainable future for all. We address the climate crisis through evidence-based advocacy, policy, movement building, research and strategic communications.



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