

Chile: 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, black carbon, and methane 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 Chile 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 more than 14,900 deaths from particulate air pollution ($PM_{2.5}$) in Chile in 2021 [1]. Of these deaths, 27.7 percent came from fossil fuel burning and 27 percent from biomass burning (Figure 1) [1]. The estimated economic value of these premature deaths was approximately US\$19.8 billion [1]. 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 Chile represent 21 percent of ischemic heart disease, 12 percent of chronic obstructive pulmonary disease (COPD), 15 percent of lower respiratory infections, and 13 percent of ischemic stroke deaths [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.

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

Chile is highly vulnerable to the impacts of climate change, including droughts, floods, and wildfires and is actively engaged in multilateral environment policy and mitigation efforts that integrate air pollution, climate change, and health. Chile has endorsed meaningful action to reduce short-lived climate pollutants including methane, black carbon, and hydrofluorocarbons. Chile's updated NDC integrated "policies related to climate and clean air, in order to mitigate short lived climate pollutants, specifically black carbon," and commits to 25 percent reduction of black carbon emissions by 2030 [3]. The

2021 National Adaptation Plan of Chile includes health as one of nine prioritized sectors, and the 2021 Long Term Low Emissions Development Strategy cites the air pollution co-benefits of reducing greenhouse gas emissions, discusses how phasing out coal and transitioning to electric vehicles can improve air quality and public health, and features a chapter on black carbon [4,5]. Chile joined the Climate and Clean Air Coalition (CCAC) in 2012 [6], and the Global Methane Pledge (GMP) in 2021 [7]. Additionally, Chile committed to build a climate-resilient health system by joining the Alliance for

Transformative Action on Climate and Health (ATACH) [8]. Chile 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..." [9]. These policy objectives can be further strengthened in Chile's third NDC, providing benefits for public health, wellbeing, development, and the economy.

SOURCES OF HEALTH-HARMING AIR POLLUTANTS IN CHILE

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, SLCP, and major contributor to ground level ozone – which has powerful impacts 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. The leading sector sources of PM_{2.5} in Chile are non-agricultural fires, industry, residential, energy, transport, and agriculture [10]; while the lead sector sources of black carbon include industry, buildings, transport, energy, waste, and agriculture; and the leading sector sources of methane include waste, agriculture, energy, buildings, industry, and transport [11] (Table 1).

Table 1: Chile sector sources of PM2.5, 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])	
*Other fires	30 %	Industry	30.1 %	Waste	63.6 %
Industry	12 %	Buildings	29.2 %	Agriculture	25.5 %
Residential	11.6 %	Transport	27.8 %	Energy	7.3 %
Energy	6 %	Energy	6.1 %	Buildings	2.8 %
Transport	6 %	Waste	4.1 %	Industry	.55 %
Agriculture	5.8 %	Agriculture	2.5 %	Transport	.26 %

Sources: State of Global Air 2024 [10]; Community Emissions Data System Historical Emissions 2024 [11]. Note*: non-agricultural.

POTENTIAL FOR HEALTH BENEFITS RESULTING FROM MITIGATION IN CHILE

Climate change mitigation efforts could provide major opportunities for the health of local populations in Chile. By targeting leading sources of GHG emissions, and reducing PM_{2.5}, black carbon, methane, and other super pollutants, Chile 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 Chile's third NDC, could help share 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.

Ambient air pollution from human activities was responsible for more than 14,900 deaths from particulate air pollution ($PM_{2.5}$) in Chile in 2021 [1]. Of these deaths, 27 percent came from fossil fuel burning and 27 percent from biomass burning (Figure 1) [1]. The estimated economic loss from these premature deaths was approximately US\$19.8 billion [1]. The vast majority 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.

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

Transport sector: Air pollution from the use of fossil fuels in the transport sector was responsible for 3,300 deaths in 2021, 22.6 percent of all air pollution-related deaths [1].

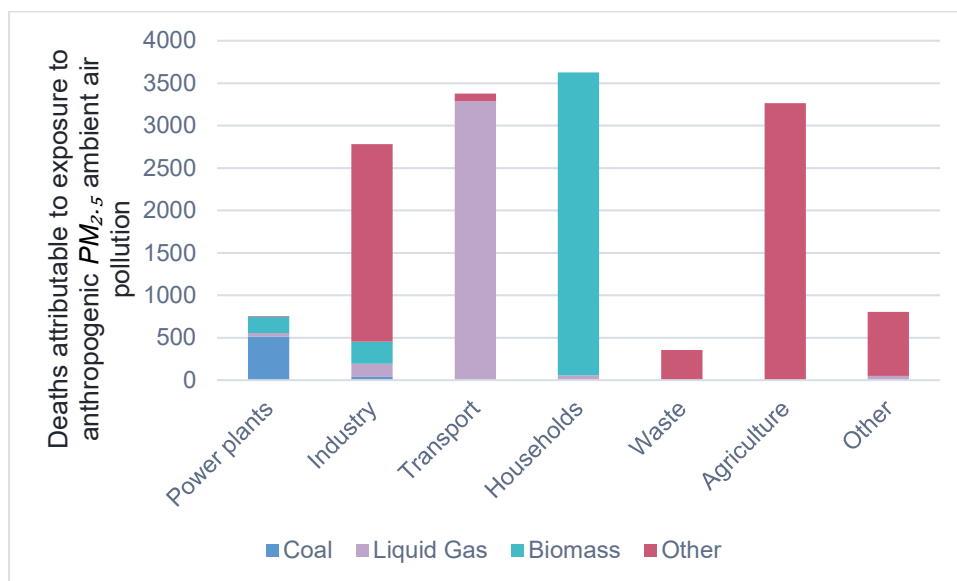
These deaths could be prevented by transitioning to zero-emissions transport systems, including by promoting the use of zero-emission public transport, electric vehicles, and active travel. Active travel, in turn, can have major health benefits by increasing physical activity.

Household sector: With 73 percent of its household energy supply coming from biomass and fossil fuels, Chile has the opportunity to prevent each year 3,600 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.

- **Combined health benefits from food system transformation:**

Chile's agricultural sector contributes significantly to both environmental and health burdens. In 2021, agricultural practices were responsible for 21.8 percent of air pollution-related deaths (an estimated 3,200 deaths) [1]. Beyond air quality impacts, the current food system also contributes to diet-related health problems. Data shows that more than 6,400 deaths were associated with excessive consumption of red meat and dairy products, while over 12,700 deaths resulted from insufficient intake of nutritious plant-based foods (including fruits, vegetables, legumes, whole grains, nuts, and seeds) [1]. Transitioning to sustainable agricultural practices would deliver multiple benefits. Reducing biomass burning and implementing climate-smart farming methods could lower air pollution levels while simultaneously promoting healthier, low-carbon diets. These shifts would address both the environmental impacts of food production and the significant diet-related health burdens facing Chile's population.

Figure 1: Deaths attributable to exposure to anthropogenic PM_{2.5} ambient air pollution in Chile 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 CHILE

People in Chile 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 Chile'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 Chile 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 Chile were approximately 118 percent and 390 percent higher than annual averages from 1986-2005 [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 nearly 14.2 million potential labour hours annually on average in Chile - a 44 percent increase in the loss of potential labour hours due to heat exposure from the 1990s [1]. This translates to an estimated US\$66 million in potential income lost annually due to heat exposure between 2014 and 2023, with the construction and agricultural sectors bearing 54.5 and 41 percent of the total impact, respectively (in total losing approximately US\$63.1 million) [1].

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- **Growing risk of transmission of infectious diseases:**

The rising temperatures and changes in humidity and precipitation patterns caused by climate change are changing the likelihood of transmission of infectious diseases transmitted by vectors (like mosquitoes or ticks). Climatic conditions in Chile are becoming increasingly suitable for the transmission of vibrio. Between 2014 and 2024, the annual average population at risk reached over 645,000, increasing by 61 percent compared to 1990 to 1999 [1]. Over the same period, the total number of reported cases rose to 277, also marking a 61 percent increase [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. From 2019 to 2023, 54 percent of Chile's land area experienced increasing extreme droughts for at least 1 month on average per year, 38 percent for at least 3 months, and 22 percent for at least 6 months [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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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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