# 2. THE PARIS AGREEMENT: THE STRONGEST PUBLIC HEALTH AGREEMENT OF THE CENTURY

The Paris Climate Agreement, signed at COP21, is a global safeguard for human health. It specifies that "Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on the right to health" and recognizes the central role of "mitigation actions and their co-benefits for adaptation, health and sustainable development" in enhanced action before 2020 *(3)*.

The 2015 Paris Agreement is the first climate agreement to gain strong global support, having now been ratified by 183 countries*(4)*. The Agreement sets clear targets: to limit global temperature rise to well below 2°C and to pursue efforts to minimize warming to no more than 1.5 °C above pre-industrial levels. It also provides mechanisms to help countries not only to meet their mitigation targets but also to effectively adapt to climate change. The NDCs allow each country to set nationally relevant, attainable commitments to meet the targets of the Agreement. Low- and middle-income countries (LMICs) are supported by funding mechanisms, with a commitment to mobilize US$ 100 billion in climate funding annually by 2020 (3). This will allow countries more flexibility in finding the most appropriate ways of tackling climate change, while ensuring that all Parties contribute to meeting global goals.

Its objective is to "strengthen the global response to climate change, in the context of sustainable development", thereby linking the climate change agenda to Agenda 2030 and the SDGs*(3, 5)*. Achieving the SDGs could improve health now and for future generations. Yet, truly sustainable development is not possible without climate mitigation and adaption, which should be included in development programmes. "Climate action is development action"*(6);* as social resilience and economic productivity depend on the good health of populations, health must be central to climate change policy. Work with countries to achieve zero-carbon development and improve adaptive capacity and resilience concurrently is central to improving health. The dual focus of the Paris Agreement on mitigation and adaptation is important for two reasons. First, countries contribute to differing extents to climate change: high-income countries (HICs) emit cumulatively more GHGs than LMICs. Secondly, countries are affected differently by climate change: those that have contributed least to anthropogenic climate change are often the most vulnerable and the most severely affected. Adaptation and mitigation are therefore essential to any successful accord, including to protect health.

Thus, the Paris Agreement is potentially the strongest health agreement of this century, as it addresses not only the health risks associated with climate change through mitigation and adaptation but also helps ensure attainment of the SDGs, which are integral to good health. Health should therefore be formally integrated within the UNFCCC negotiations and the Paris Agreement itself (see below).

# HEALTH IN THE UN CLIMATE NEGOTIATIONS

***Key elements and opportunities for human health advocacy in the UN climate negotiations***

## 1 Health in the UNFCCC legal framework

- Health is a key element in UNFCCC articles 1 & 4.1.f
- Right to health is a key human right in the preamble of the Paris Agreement (PA)
- Human Rights key elements of PA work programme: Article 6 (Action for Climate Empowerment); 8 (Loss and Damage) and 10 (Technology transfer)

**Opportunity** to take up health in all negotiating streams with a Human Rights focus, as well as in the indigenous peoples platform, Talanoa Dialogue, and in ACE.

## 2 Health in Climate Science

- Health is a key element in the IPCC Special Report on 1.5°
- Climate Change impacts on health
- The greater the warming, the greater the risks for human health
- The speed and type of mitigation has a direct health effect

**Opportunity** to engage health professionals in science-based impact assessments and climate policies

## 3 Health in Mitigation

- Health in the NDCs: Health cobenefits from climate mitigation actions
- Social Cost of Carbon & Social Value of Mitigation both increase when considering human health
- Climate-smart healthcare: need for mitigation within the healthcare sector

**Opportunity** for inclusion of health in all NDCs

## 4 Health in Adaptation

- Health in the NDCs: Half of all current NDC´s mention health in relation to adapta-
- The longer it takes to reduce emissions, the greater the adaptation needed to protect population health
- The managing of climate impacts by health systems is unavoidable, no matter the extent of mitigation
- Health as an overarching adaptation strat-

**Opportunity** for health measures to be integrated in all National Adaptation Plans (NAPs)

## 5 Health in Loss & Damage

- Health is a non-economic impact under L&D
- Health is an action area under the WIM (Warsaw International Mechanism) workplan

**Opportunity** for health to be included in the WIM Executive Committee on climate-induced migration & the Nansen Initiative

## 6 Health in Climate Finance

- Some finances from Global Environment Facility (GEF) already support health projects
- All World Bank development aid to be screened for pollution prevention

**Opportunity** to add human health & development as both requirements and measures for all climate finance streams

## 2.1 The strong linkage between climate change, air pollution and health

The human activities that are destabilizing the Earth's climate also contribute directly to ill health. The most direct link between climate change and ill health is air pollution. Burning fossil fuels for power, transport and industry is the main source of the carbon emissions that are driving climate change and a major contributor to health-damaging air pollution, which every year kills over seven million people due to exposure inside and outside their homes *(7)*. Over 90% of the urban population of the world breathes air containing levels of outdoor air pollutants that exceed WHO's guidelines. Air pollution inside and outside the home is the second leading cause of deaths from NCDs worldwide; it is responsible for 26% of deaths from ischaemic heart disease, 24% of those from strokes, 43% from chronic obstructive pulmonary disease and 29% from lung cancer.

The sectors that produce most GHGs – energy, transport, industry, agriculture, waste management and land use – are also the main sources of fine particulate matter and other important air pollutants (Fig. 1). These include short-lived climate pollutants such as black carbon, methane and ground-level ozone, which also threaten human health. Approximately 25% of urban ambient air pollution from fine particulate matter is contributed by traffic, 15% by industrial activities including electricity generation, 20% by domestic fuel burning, 22% from unspecified sources of human origin and 18% from natural sources *(8)*. Effectively all exposure to indoor air pollution, which causes almost four million deaths a year, is from use of solid fuels for cooking in poor households. Global contributions of different sectors to the GHG emissions that drive climate change are 14% from transport, 34.6% from energy for electricity generation and heat, 21% from industry, 6.4% from buildings and 24% from agriculture and land use change *(9)* (Fig. 2). The sources of climate change and air pollution are therefore broadly the same: polluting energy systems.

**Figure 1** **Impacts of different air pollutants and greenhouse gases on climate and health (10)**

| AIR POLLUTANT / GHG | LIFETIME/ SCALE | CLIMATE IMPACT | HEALTH/ECOSYSTEM IMPACTS |
|---|---|---|---|
| Carbon Dioxide | | | |
| Fluorinated Gases (F-gases) | | | |
| Methane ($CH_4$) Nitrogen Oxides | | | |
| Nitrogen Oxides | | | |
| Nitrous Oxides | | | |
| Particulate Matter | | | |
| Sulphur Dioxide | | | |
| Tropospheric Ozone ($O_3$) | | | |
| Volatile Organic Compounds (VOCs)/ Carbon Monoxide | | | |

Lifetime in Atmosphere = days/weeks
Impact Scale=local/regional

Lifetime in Atmosphere= years
Impact Scale=global

Warm-

Cooling

Human Health

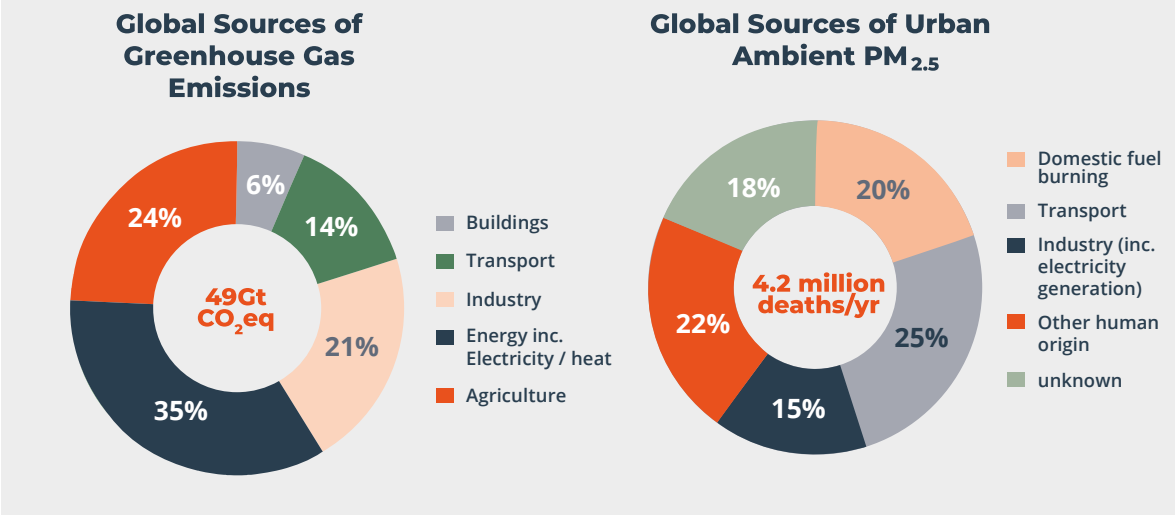
Ecosystem

No direct impact on human health or ecosystems*

*No direct impact implies the substance in question either does not directly cause human health or ecosystem impacts or it does not go through a chemical process to create a substance that directly impacts human health and ecosystems

**Figure 2**

**Main sources of (a) greenhouse gas emissions and (b) urban ambient air pollution *(8, 9)***



Some of the same pollutants contribute to both climate change and local air pollution. Black carbon, produced by inefficient combustion in sources such as cookstoves and diesel engines, is the second greatest contributor to global warming after $CO_2$. Black carbon also affects regional climate systems, accelerating glacier retreat in mountainous regions and the Arctic and disrupting the South Asian monsoon (10). It is also a significant contributor (5–15%) of urban exposure to fine particulate matter. The next largest contributor to global warming is methane, which reacts with other pollutants to form ozone; it is responsible for 230 000 deaths from chronic respiratory disease each year.

A warming climate will worsen air quality. If current emissions continue, ground-level ozone events are expected to intensify, especially in densely populated areas, leading to more respiratory illness. In certain areas, the frequency and extent of wildfires – and with them, emissions of particulate matter and other pollutants – are projected to increase. In other areas, a drier climate will lead to more dust storms; in others, pollen and other airborne allergens are likely to become more prevalent.

Air pollution crosses borders, and pollution in other regions or countries can contribute to local levels. Concerted action is therefore required at urban, national, regional and international levels to make a meaningful impact on health (11). International mechanisms exist, notably the Convention on Long-range Transboundary Air Pollution, with 51 Parties mainly in Europe and North America. For the most part, however, air pollution is regulated locally, resulting in gaps in monitoring, data collection and enforcement of emission controls. Fragmented policies present a particular challenge for reducing short-lived climate pollutants, as there are currently no national or international regulatory obligations to monitor, measure or report black carbon emissions. Under the Paris Agreement, each country regularly submits reports on its activities to mitigate climate change, but they are not required to report on steps to reduce short-lived pollutants, even though it will probably be impossible to meet the targets of the Agreement unless those emissions are reduced.

Most measures to mitigate climate change will strengthen and promote health and sustainable development. As the measures become more aggressive, the synergy will be closer: gains in air quality will, overall, lead to significant improvements in health. In some cases, there may be trade-offs between climate mitigation, sustainable development and health objectives. Reducing such trade-offs will require policies to ensure that the most vulnerable people do not suffer from unintended consequences.

The recent report from the Intergovernmental Panel on Climate Change (IPCC) (12) revealed a rapidly

closing window of opportunity to maintain global warming under 1.5 °C and stimulated a renewed sense of urgency among decision-makers. Growing public awareness of the health burden associated with air pollution may be a powerful catalyst for collective ambition to mitigate climate change. Greater coordination among the health, energy, transport, agriculture, urban planning and other sectors will be necessary to set priorities that ensure maximum benefits for both health and climate. The health sector could support countries in conducting evidence-based analyses and estimating the benefits to health and the climate. The effect would be maximized by a unified governance and policy framework in which reducing air pollution and promoting the right to clean air are recognized as drivers of efforts to mitigate climate change and reduce the related health risks (Box 1).

Box 1

## First WHO Global Conference on Air Pollution and Health

The first WHO Global Conference on Air Pollution and Health took place on 30 October–1 November 2018 in Geneva. The conference was held in response to World Health Assembly resolution 68.8 (2015) in which ministers of health requested a significant increase in the response to air pollution, including associated diseases, exposure and the costs to society. The "road map for an enhanced global response to the health impacts of air pollution", adopted by the World Health Assembly in 2016 requested WHO to organize a global conference to review progress and set targets for further action.

The Conference set the aspirational goal of reducing the number of deaths from air pollution by two thirds by 2030. Participants recognized that the response should be multisectoral, and synergy among health, climate and development should be ensured. The "Geneva Action Agenda to Combat Air Pollution" lists 17 activities that would increase countries' ability to achieve the goal (13). They include: scaling up and mobilizing action (particularly through the BreatheLife campaign); providing clean energy and transport alternatives; strengthening action to protect the most vulnerable populations (particularly children); extending clean energy access in Africa and to other populations in need; enhancing interventions to prevent NCDs; establishing a monitoring and evaluation mechanism on governance and health impacts; and improving gender equity by increased access to clean household energy and technologies.

# 2.2 Health impacts of climate change

Warming trends are continuing worldwide, accompanied by increasing numbers of extreme weather events, rising by 46% between 2000 and 2013 *(12, 14)*. A changing, more variable climate is now recognized as the most likely, highest-impact global risk to society as a whole and which presents a clear and present danger to health security *(15, 16)*. In 2017 and 2018 alone, populations around the world were exposed to heatwaves (for example, in Japan and the United Kingdom), severe flooding (for example, in China, France and India), wildfires (for example, in Greece, Sweden and the USA) and tropical storms (for example, in Japan, the Philippines and the USA).

Climate change can affect human health both directly and indirectly. The direct health impacts include physiological effects of exposure to higher temperatures, increasing incidences of NCDs such as respiratory and cardiovascular disease and injuries and death due to extreme weather events such as droughts, floods, heatwaves, storms and wildfires. Climate change has indirect effects on health due to ecological changes, such as food and water insecurity and the spread of climate-sensitive infectious diseases, and also to societal responses to climate change, such as population displacement and reduced access to health services *(17)*. As indirect effects of climate change may result from long causal pathways, they are particularly difficult to anticipate. The effects may be short- or long-term and direct or indirect, sometimes with life-long consequences for health and well-being. For example, NCDs such as mental illness after extreme weather events, climate-related displacement, immigration and loss of culture can be lifelong.

The capacity of disease vectors to spread infectious diseases is increasing as a result of climatic shifts; for example, the vectorial capacity of the mosquitoes that are primarily responsible for the transmission of dengue fever has risen by approximately 10% since the 1950s: *(14)*. Ecological shifts as a result of climate changes may have further health effects, by affecting water and sanitation and causing food insecurity and malnutrition *(18)*. Malnutrition is anticipated to be one of the greatest threats to health resulting from climate change, and the young and the elderly will be particularly affected. Climate variation and extremes are among the leading causes of severe food crises, and the cumulative effect is undermining all dimensions of food security, including availability, access, use and stability. Rising temperatures, floods and droughts also affect food safety; for example, rising temps can increase the levels of pathogens in food sources (such as ciguatera in fish) and in food, and flooding increases the risk that pathogens will spread from livestock.

The effects on nutrition also include impaired nutrient quality of crops, the diversity of food produced and consumed, impacts on water and sanitation, patterns of risks and changes in maternal care, child care and breastfeeding *(19, 20)*.

Broader dimensions are important in determining the health outcomes of climate change and associated events and can limit the ability of health systems to deliver health protection and care, in the short-, medium- and long-term. It is widely recognized that, while everyone will be affected by climate change, the poorest and most vulnerable populations will suffer the greatest health impacts. Although LMICs

have contributed the least to GHG emissions, their populations will bear the brunt of climate-related health impacts *(21)*. Inequities also occur within countries, due to economic, environmental and social determinants. Thus, people who are poor and undernourished, already ill, have insecure housing, farm degraded land, work in unsafe conditions, have little education, are deprived of their rights or live in places with poor health systems, limited resources and poor governance cannot influence decisions *(22)*. It will be critical to address such inequities in order to reduce vulnerability, build resilience and prevent greater inequity as a result of climate change *(23, 24)*.

The impacts of climate change on health are strongly influenced by individual and population factors, including age (children and the elderly are often at higher risk) and gender. For example, during droughts, women and children in developing countries are often the worst affected, as a consequence of their respective roles in household decisions, and tasks such as water collection. In contrast, male farmers have been found to be disproportionately likely to commit suicide during droughts *(25)*. Understanding gender differences in vulnerability, roles and capacity is essential to design effective, equitable climate adaptation programmes *(26)* and go towards meeting SDG 5 (gender equality) more broadly.

The impacts of climate variation and change on vulnerable infrastructure can increase health risks; for instance, more extreme storms and flooding can disrupt energy distribution and result in chemical and biological contamination of water supplies and sanitation *(27)*. Health facilities are vulnerable to extreme weather events and to sea level rise in coastal locations and to increasing demand as a result of hazards, the spread of vector- and waterborne infectious diseases, food insecurity and forced migration.

Fig. 3 shows some of the direct and indirect links between climate change and health, case studies of the effects of climate change on health and certain factors that mediate health outcomes.

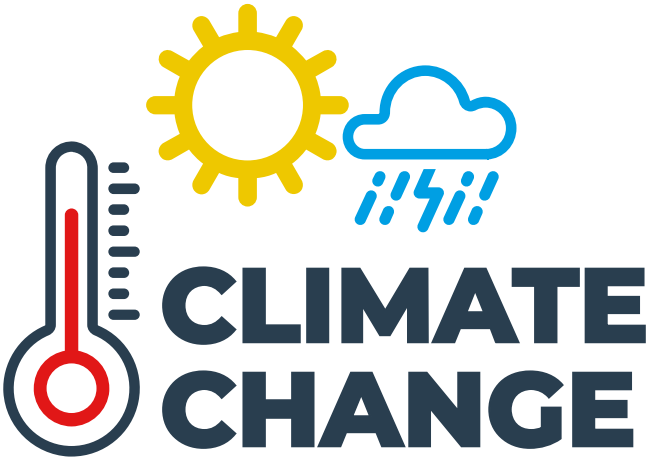



**Figure 3**

Climate change impacts health both directly and indirectly, but is strongly mediated by environmental, social and public health determinants. From references (14, 28-32).

## DIRECT IMPACTS

- Storm
- Drought
- Flood
- Heatwave
- Temperature Change
- Wildfires

## INDIRECT IMPACTS

- Water Quality
- Air Quality
- Land Use Change
- Ecological change

## MEDIATING FACTORS

### ENVIRONMENTAL

- Geography
- Baseline weather
- Soil / dust
- Vegetation
- Baseline air / water quality

### SOCIAL

- Loss of habitation
- Poverty
- Displacement
- Conflict
- Age and gender

### RESILIENCY

- Early-warning system
- Socioeconomic status
- Health and nutrition
- Primary health care

# HEALTH IMPACTS


Mental Illness


Undernutrition


Injuries


Respiratory Disease


Allergies


Cardiovascular Disease


Infectious Diseases

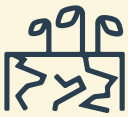

Poisoning


Water-Borne Diseases


Heat Stroke

**Case study: Heatwaves.**
The number of vulnerable people exposed to heatwaves increased by 125 million between 2000 and 2016. One of the most extreme heatwaves was the 2003 European heatwave, which was made twice as likely by climate change. Over 70,000 additional deaths occurred over Europe as a result of the heatwave.

**Case study: Temperature change.**
Exposure to rising temperatures has known associations with rising occurrence of NDCs, such as cardiovascular disease. An 11 year study in Burkina faso has shown that exposure to moderate or extreme heat significantly increases excess daily premature mortality from NCDs; cardiovascular disease accounted for 50% of years of life lost in this study.



**Case study: Drought.**
Ethiopia has been victim to regular famines since the 1980s, with droughts being a significant contributing factor. A consequence of this is child undernutrition and wasting. For instance, in areas affected by moderate drought in Ethiopia, child wasting was 34% higher than areas unaffected by drought. However, social mediating factors also play an important role. Firstly, areas affected by severe droughts suffered less from child wasting, as aid programmes were targeted in these areas. Secondly, areas of conflict show clear links with higher levels of undernutrition, as a result of decreased food security.

**Case study: Flooding.**
Over the last 40 years, more than 90% of natural disasters affecting Pakistan have been triggered by climate change. Flooding has been increasingly affecting Pakistan. For example, in 2010, over 15 million people were affected by flooding, with 6 million people in need of urgent medical care. Attending to these health needs was extremely difficult, as over 200 health care facilities were destroyed by the floods.

Fig. 3 provides clear evidence that climate change is closely associated with human health and that health is negatively affected by rising exposure and vulnerability to climatic stresses (14). Even if all emissions of GHGs were stopped today, the climate would still change, because of cumulative GHG emissions *(33)*.

While broad projections can be made of how climate change will affect human health, the precise impacts in specific places are difficult to predict accurately. Further research is required to provide better information to policy- and decision-makers so that they can design effective policies (34). There are three main sources of uncertainty in projecting the impact of climate change on health. First, the impact will be determined by the extent of climate change resulting from GHG emissions, which in turn are the result of development pathways and policies. The IPCC and the scientific community describe the possibilities as four "representative concentration pathways", which give a plausible range of the extent of climate "forcing" that reflects different GHG emission scenarios *(33)*. These can be used to estimate possible health outcomes. Secondly, while climate modelling has vastly improved, there is still some unavoidable uncertainty over how the climate system responds to GHG emissions and the effects of changes. Thirdly, health outcomes are strongly affected by mediating factors such as societal responses. Resilience will be a vital determinant of the severity of health outcomes, as the greater the resilience of a population, the better it can cope with climate change.

Modelling has been conducted to project potential future health impacts of climate change. Exposure to heat, droughts, floods and heatwaves is projected to increase globally. As many as 3 billion people aged > 65 years (who are particularly vulnerable) may be exposed to heatwaves by 2100, because of a combination of increasing temperatures, ageing and urbanization *(35)*. The warmest and poorest countries of the world will be most severely affected by climate change, particularly in South Asia *(36, 37)*. Overall, the health impacts of climate change could force 100 million people into poverty by 2030, with strong impacts on mortality and morbidity *(38)*. A highly conservative estimate of 250 000 additional deaths each year due to climate change has been projected between 2030 and 2050; of these, 38 000 will result from exposure of the elderly to heat, 48 000 from diarrhoea, 60 000 from malaria and 95 000 from childhood undernutrition. These estimates were calculated within an optimistic scenario in terms of future socioeconomic development and adaptation; furthermore, they cover only four direct effects of climate change on health, while there are many more direct and indirect effects and more complex causal pathways that have not been quantified. Thus, the health of hundreds of millions more people could be affected by climate change *(37)*.

In the short to medium term (to the middle of the 2000s), the health impact of climate change will be determined mainly by the vulnerability of populations and their resilience to the current rate of climate change. In the longer term, the effects will increasingly depend on the extent of climate change, as the health outcomes in scenarios of high and low emissions in the second half of the century differ significantly (Box 2). Ambitious, urgent mitigation and adaptation now could help to meet the goals of the Paris Agreement and secure attainment of the SDGs, to which good health is central.

Box 2

## Health impacts under scenarios of warming by 1.5 °C and 2.0 °C

The Paris Agreement commits nations to prevent a rise in global temperatures well below 2 °C above pre-industrial levels and to try to reduce the rise to 1.5 °C. At COP21 in 2015, the IPCC was asked to report on the impacts of warming by 1.5 °C and 2.0 °C. The conclusion of the report, published in October 2018 (14), was that climate change is already affecting human health, with increasing exposure and vulnerability recorded worldwide. Furthermore, warming of even 1.5 °C is not considered "safe". The most disadvantaged, vulnerable, poor populations are expected to be disproportionately affected by warming to 1.5 °C, with rising food and water insecurity, higher food prices, loss of income and livelihood opportunities, negative health effects and population displacement (including forced migration). Thus, climate change is considered to be a "poverty multiplier", which could force 100 million people into extreme poverty.

With warming by 1.5 °C, 350 million more people could be exposed to deadly heat stress by 2050, with higher numbers exposed if warming is by 2.0 °C. The risks for SIDS are expected to be severe, with particular concern regarding storm surges, coastal flooding and sea level rise. Shifting weather patterns are also changing the geographical range, seasonality and intensity of transmission of climate-sensitive diseases, as greater warming will increase the range of certain vectors and diseases (including malaria, dengue, West Nile and Lyme disease) to previously unexposed areas, including within Europe and North America. Warming by 2.0 °C is also expected to exacerbate air pollution and the associated deaths from ozone as compared with warming by 1.5 °C. Food security is widely considered to be a major health risk of climate change and is expected to be worse at 2 °C than at 1.5 °C; it is projected that 540–590 million people will be undernourished at warming by 2 °C and 530–550 million people at warming by less than 1.5 °C. Children will be particularly badly affected, with more undernutrition and consequent stunting. Reducing warming to 1.5 °C would markedly decrease the likelihood of drought and water stress, especially in the Mediterranean and southern Africa.

If climate change is not mitigated, global income inequality could increase grossly. As the health impacts of climate change are unevenly distributed, existing inequities will be exacerbated, more at 2.0 °C than at 1.5 °C warming. Maintaining the temperature rise to 1.5 °C could therefore prevent some of the worst health effects of climate change and improve the effectiveness of adaptation, which will become increasingly restricted at warming by 2.0 °C or more. Additionally, at a temperature rise of no more than 1.5 °C, sustainable development would be substantially easier to achieve (including meeting the SDGs), as would eradication of poverty, reduction of inequalities and prevention of health effects. The health threats at 1.5 °C warming are, however, still significant, and targets to prevent the harmful effects of climate change on human health and welfare might not be met in this scenario. These findings should provide a strong incentive for countries to commit themselves to more ambitious mitigation and adaptation targets to minimize the health impacts of climate change. The IPCC report indicates that maintaining warming below 1.5 °C could be achieved in tandem with poverty alleviation, improving energy security and health benefits, which, furthermore, could be greater than the costs of mitigation costs *(14)*.