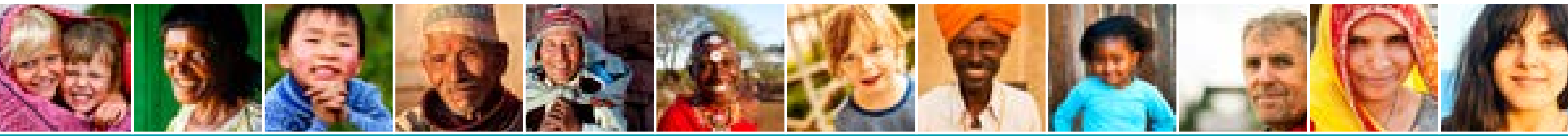
CLIMATE AND HEALTH COUNTRY PROFILE – 2015

MYANMAR

World Health Organization

United Nations Framework Convention on Climate Change



OVERVIEW

The Republic of the Union of Myanmar is a lower-middle income country in Southeast Asia which has experienced economic and political reform since military rule ended in late 2010. The lowlands of the country have a tropical monsoon climate, whilst the highlands vary from subtropical to alpine, with harsh tundra and Arctic conditions at higher elevations.

Myanmar is already vulnerable to extreme weather events, such as cyclones and floods, and is highly vulnerable to climate change, with Yangon – the largest city – being amongst the top 5 most vulnerable cities to climate change worldwide.[a]

Climate change leading to rainfall pattern variation may significantly increase the risk of flooding. Rising temperatures and drought periods are also predicted, alongside increased risk of cyclones and strong winds [Myanmar INDC, 2015]. Vector-borne diseases may increase and food and water insecurity will likely worsen.

In 2011, Myanmar made the environment one of the seven strategic pillars of its National Comprehensive Development Plan and is currently developing a climate change strategy [Myanmar INDC, 2015]. Though implementation of adaptation projects has been limited by resource constraints, Myanmar has participated in a number of regional initiatives focusing on knowledge sharing and policy development.[a]

SUMMARY OF KEY FINDINGS

- In Myanmar, under a high emissions scenario, mean annual temperature is projected to rise by about 4.6°C on average from 1990 to 2100. If global emissions decrease rapidly, the temperature rise is limited to about 1.4°C (page 2).
- In Myanmar, under a high emissions scenario, and without large investments in adaptation, an annual average of 18 million people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If global emissions decrease rapidly and there is a major scale up in protection the annual affected population could be limited to about 21,000 people (page 3).
- The risk of vector-borne diseases, such as malaria and dengue fever, are expected to increase towards 2050; a reduction in global emissions could help reduce these risks in the future (page 3).
- In Myanmar, under a high emissions scenario heat-related deaths in the elderly (65+ years) are projected to increase to about 38 deaths per 100,000 by 2080 compared to the estimated baseline of under 6 deaths per 100,000 annually between 1961 and 1990. A rapid reduction in global emissions could limit heat-related deaths in the elderly to about 12 deaths per 100,000 in 2080 (page 4).

OPPORTUNITIES FOR ACTION

Myanmar has submitted a National Communication to the UNFCCC which includes the health implications of climate change mitigation policies. Country reported data (see section 6) indicate there are further opportunities for action in the following areas:

1) Adaptation

- Conduct a national assessment of climate change impacts, vulnerability and adaptation for health.
- Implement actions to build technical and institutional capacities to work on climate change and health.
- Estimate the costs to implement health resilience to climate change and include these costs in planned allocations from domestic or international funds.

2) Mitigation

- Conduct a valuation of the health co-benefits of climate change mitigation actions.

3) National Policy Implementation

- Develop and approve a national health adaptation strategy.
- Nominate a national focal point on climate change and health in the relevant government body.
- Develop a national strategy on climate change mitigation which includes consideration of the health implications of climate change mitigation actions.

DEMOGRAPHIC ESTIMATES	
Population (2014)[b]	51.49 million
Population growth rate (2014)[b]	0.89%
Population living in urban areas (2014)[b]	30%
Population under five (2014)[b]	8.89%
Population aged 65 or over (2014)[b]	5.76%
ECONOMIC AND DEVELOPMENT INDICATORS	
GDP per capita (current US$, 2013)[c]	1107 USD
Total expenditure on health as % of GDP (2013)[d]	1.8 %
Percentage share of income for lowest 20% of population (2010)[c]	NA
HDI (2013, +/- 0.01 change from 2005 is indicated with arrow)[e]	0.524 ▲
HEALTH ESTIMATES	
Life expectancy at birth (2014)[b]	66.8 years
Under-5 mortality per 1000 live births (2014)[b]	72

a LSE 2015. Grantham Research Institute on Climate Change and the Environment. http://www.lse.ac.uk/GranthamInstitute/legislation/countries/myanmar/
b The 2014 Myanmar Population and Housing Census, Highlights of the Main Results, Census Report Volume 2-A, Department of Population, Ministry of Immigration and Population, May 2015.
c World Development Indicators, World Bank (2016)
d Global Health Expenditure Database, WHO (2014)
e United Nations Development Programme, Human Development Reports (2014)

1 CURRENT AND FUTURE CLIMATE HAZARDS

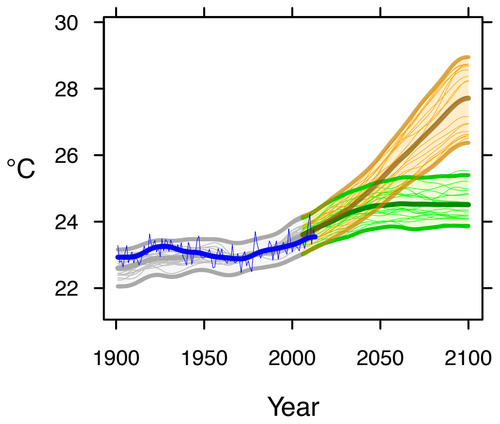
Due to climate change, many climate hazards and extreme weather events, such as heat waves, heavy rainfall and droughts, could become more frequent and more intense in many parts of the world.

Outlined here are country-specific projections up to the year 2100 for climate hazards under a 'business as usual' high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions. Most hazards caused by climate change will persist for many centuries.

COUNTRY-SPECIFIC CLIMATE HAZARD PROJECTIONS

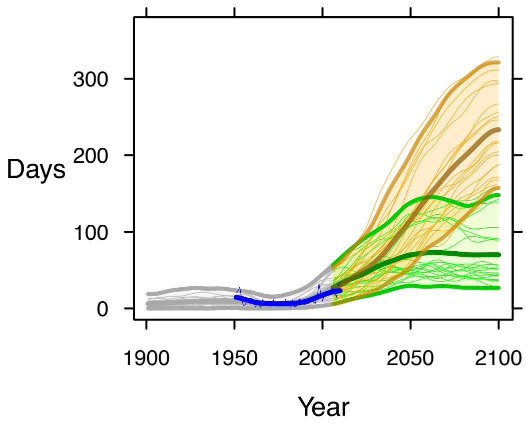
The model projections below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 [RCP8.5] (in orange) and a low emissions scenario, [RCP2.6] (in green).[a] The text boxes describe the projected changes averaged across about 20 models (thick line). The figures also show each model individually as well as the 90% model range (shaded) as a measure of uncertainty and, where available, the annual and smoothed observed record (in blue).[b,c]

MEAN ANNUAL TEMPERATURE



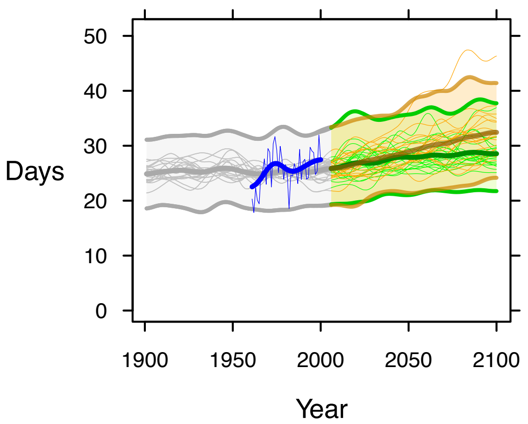
Under a high emissions scenario, mean annual temperature is projected to rise by about 4.6°C on average from 1990 to 2100. If emissions decrease rapidly, the temperature rise is limited to about 1.4°C.

DAYS OF WARM SPELL ('HEAT WAVES')



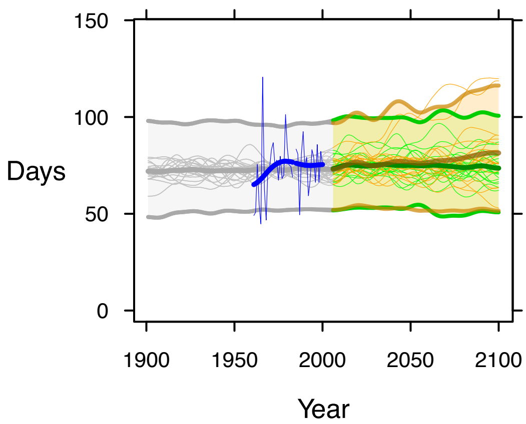
Under a high emissions scenario, the number of days of warm spell[d] is projected to increase from about 10 days in 1990 to about 230 days on average in 2100. If emissions decrease rapidly, the days of warm spell are limited to about 70 on average.

DAYS WITH EXTREME RAINFALL ('FLOOD RISK')



Under a high emissions scenario, the number of days with very heavy precipitation (20 mm or more) is indicated to increase by about 7 days on average from 1990 to 2100, increasing the risk of floods. Some models indicate increases outside the range of historical variability, implying even greater risk. If emissions decrease rapidly, the increase in risk is much reduced.

CONSECUTIVE DRY DAYS ('DROUGHT')



Under a high emissions scenario, the longest dry spell is indicated to increase by about 8 days on average, to about 80 days on average in 2100, with continuing large year-to-year variability. If emissions decrease rapidly, no increase is indicated.

a Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.
b Observed historical record of mean temperature is from CRU-TSv.3.22; observed historical records of extremes are from HadEX2.
c Analysis by the Climatic Research Unit and Tyndall Centre for Climate Change Research, University of East Anglia, 2015.
d A 'warm spell' day is a day when maximum temperature, together with that of at least the 6 consecutive previous days, exceeds the 90th percentile threshold for that time of the year.

2 CURRENT AND FUTURE HEALTH RISKS DUE TO CLIMATE CHANGE

Human health is profoundly affected by weather and climate. Climate change threatens to exacerbate today's health problems – deaths from extreme weather events, cardiovascular and respiratory diseases, infectious diseases and malnutrition – whilst undermining water and food supplies, infrastructure, health systems and social protection systems.

ANNUAL EXPOSURE TO FLOODING DUE TO SEA LEVEL RISE, MYANMAR (2070–2100)

Severity of climate change scenario

	Without Adaptation	With Adaptation
RCP2.6	15,821,000	21,000
RCP8.5	18,078,000	30,400

* Medium ice melting scenario ** Values rounded to nearest '00

Under a high emissions scenario, and without large investments in adaptation, an annual average of 18 million people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If global emissions decrease rapidly and there is a major scale up in protection (i.e. continued construction/raising of dikes) the annual affected population could be limited to about 21,000 people. Adaptation alone will not offer sufficient protection, as sea level rise is a long-term process, with high emissions scenarios bringing increasing impacts well beyond the end of the century.

Source: Human dynamics of climate change, technical report, Met Office, HM Government, UK, 2014.

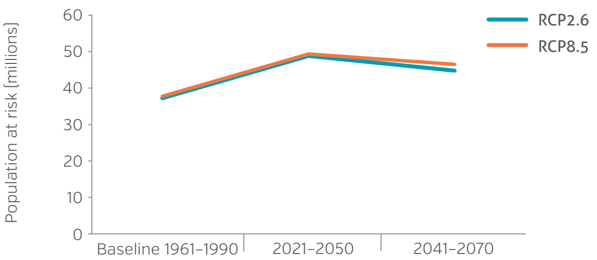
KEY IMPLICATIONS FOR HEALTH

Myanmar also faces inland river flood risk. It is projected, that by 2030, an additional 299,900 people may be at risk of river floods annually as a result of climate change above the estimated 180,100 annually affected population in 2010.[a]

In addition to deaths from drowning, flooding causes extensive indirect health effects, including impacts on food production, water provision, ecosystem disruption, infectious disease outbreak and vector distribution. Longer term effects of flooding may include post-traumatic stress and population displacement.

INFECTIOUS AND VECTOR-BORNE DISEASES

Population at risk of malaria in Myanmar (in millions)



By 2070, under a high emissions scenario about 46 million people are projected to be at risk of malaria. A low emissions scenario could slightly reduce the population at risk towards 2070. Population growth can also cause increases in the population at-risk in areas where malaria presence is static in the future.

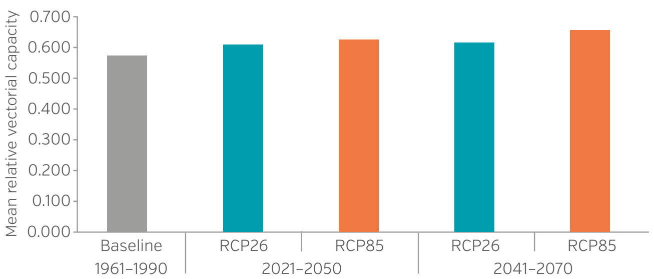
Source: Rocklöv, J., Quam, M. et al. 2015.[d]

KEY IMPLICATIONS FOR HEALTH

Some of the worlds most virulent infections are also highly sensitive to climate: temperature , precipitation and humidity have a strong influence on the life-cycles of the vectors and the infectious agents they carry and influence the transmission of water and food-borne diseases.[b]

Socioeconomic development and health interventions are driving down burdens of several infectious diseases, and these projections assume that this will continue. However, climate conditions are projected to become significantly more favourable for transmission, slowing progress in reducing burdens, and increasing the populations at risk if control measures are not maintained or strengthened.[c]

Mean relative vectorial capacity for dengue fever transmission in Myanmar



Under a high emissions scenario, the mean relative vectorial capacity for dengue fever transmission is projected to increase to about 0.66 from the baseline period of about 0.57. If global emisssions decline rapidly the mean relative vectorial capacity for dengue transmission could be limited to about 0.62 towards 2070.

Source: Rocklöv, J., Quam, M. et al., 2015.[d]

a World Resources Institute, http://www.wri.org. Aqueduct Global Flood Analyzer. Assumes continued current socioeconomic trends (SSP2) and a 25-year flood protection.
b Atlas of Health and Climate, World Health Organization and World Meteorological Organization, 2012.
c Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014.
d Country-level analysis, completed in 2015, was based on health models outlined in the Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014. The mean of impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable).

HEAT-RELATED MORTALITY

Heat-related mortality in population 65 years or over, Myanmar (deaths / 100,000 population 65+ yrs)

Under a high emissions scenario heat-related deaths in the elderly (65+ years) are projected to increase to about 38 deaths per 100,000 by 2080 compared to the estimated baseline of under 6 deaths per 100,000 annually between 1961 and 1990. A rapid reduction in global emissions could limit heat-related deaths in the elderly to about 12 deaths per 100,000 in 2080.

Source: Honda et al., 2015.[a]

KEY IMPLICATIONS FOR HEALTH

Climate change is expected to increase mean annual temperature and the intensity and frequency of heat waves resulting in a greater number of people at risk of heat-related medical conditions.

The elderly, children, the chronically ill, the socially isolated and at-risk occupational groups are particularly vulnerable to heat-related conditions.

UNDERNUTRITION

Climate change, through higher temperatures, land and water scarcity, flooding, drought and displacement, negatively impacts agricultural production and causes breakdown in food systems. These disproportionally affect those most vulnerable people at risk to hunger and can lead to food insecurity. Vulnerable groups risk further deterioration into food and nutrition crises if exposed to extreme climate events.[b]

Without considerable efforts made to improve climate resilience, it has been estimated that the global risk of hunger and malnutrition could increase by up to 20 percent by 2050.[b]

In Myanmar, the prevalence of stunting in children under age 5 was 35.1% in 2010, the prevalence of underweight children and wasting in children under 5 was 22.6% and 7.9%, respectively, in 2010.[c]

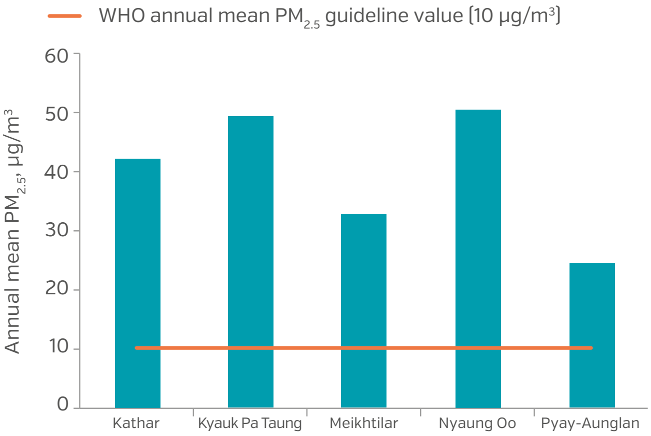
a Country-level analysis, completed in 2015, was based on health models outlined in the Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014. The mean of impact estimates for three global climate models are presented. Models assume continued socioeconomic trends (SSP2 or comparable).
b World Food Project 2015 https://www.wfp.org/content/two-minutes-climate-change-and-hunger
c World Health Organization, Global Database on Child Growth and Malnutrition (2015 edition). Please see source for definitions of child malnutrition measures.

3 CURRENT EXPOSURES AND HEALTH RISKS DUE TO AIR POLLUTION

Many of the drivers of climate change, such as inefficient and polluting forms of energy and transport systems, also contribute to air pollution. Air pollution is now one of the largest global health risks, causing approximately seven million deaths every year. There is an important opportunity to promote policies that both protect the climate at a global level, and also have large and immediate health benefits at a local level.

OUTDOOR AIR POLLUTION EXPOSURE

Outdoor air pollution in Myanmar cities annual mean $PM_{2.5}$ (µg/m³), 2013*



KEY IMPLICATIONS FOR HEALTH

Outdoor air pollution can have direct and sometimes severe consequences for health.

Fine particles which penetrate deep into the respiratory tract subsequently increase mortality from respiratory infections, lung cancer and cardiovascular disease.

The cities for which the most recent air pollution data was available (2013) had annual mean $PM_{2.5}$ levels that were above the WHO guideline value of 10 µg/m³.

Source: Ambient Air Pollution Database, WHO, May 2016.

* A standard conversion has been used, see source for further details.

HOUSEHOLD AIR POLLUTION

MYANMAR

Percentage of population primarily using solid fuels for cooking (%), 2013

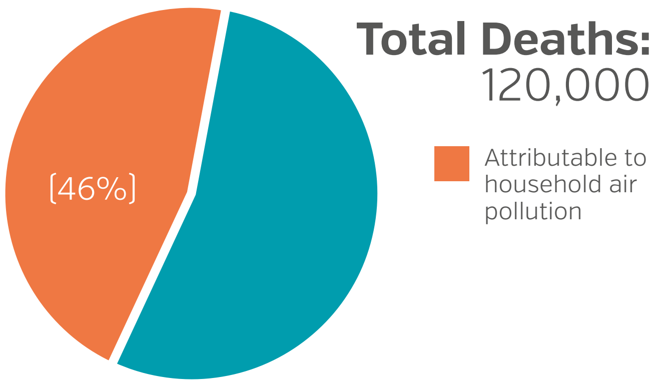
RURAL AREAS
>95

URBAN AREAS
81

NATIONAL TOTAL
93

Source: Global Health Observatory, data repository, World Health Organization, 2013.

Percent of total deaths from ischaemic heart disease, stroke, lung cancer, chronic obstructive pulmonary disease (18 years +) and acute lower respiratory infections (under 5 years) attributable to household air pollution, 2012.



Source: Global Health Observatory, data repository, World Health Organization, 2012.

KEY IMPLICATIONS FOR HEALTH

Air pollution in and around the home is largely a result of the burning of solid fuels (biomass or coal) for cooking.

Women and children are at a greater risk for disease from household air pollution. Consequently, household air pollution is responsible for a larger proportion of the of total number of deaths from ischaemic heart disease, stroke, lung cancer and COPD in women compared to men.[a]

In Myanmar, 62% percent of an estimated 8,100 child deaths due to acute lower respiratory infections is attributable to household air pollution (WHO, 2012).

a Annu. Rev. Public. Health. 2014.35:185-206. http://www.who.int/phe/health_topics/outdoorair/databases/HAP_BoD_results_March2014.pdf?ua=1

4 CO-BENEFITS TO HEALTH FROM CLIMATE CHANGE MITIGATION: A GLOBAL PERSPECTIVE

Health co-benefits are local, national and international measures with the potential to simultaneously yield large, immediate public health benefits and reduce the upward trajectory of greenhouse gas emissions. Lower carbon strategies can also be cost-effective investments for individuals and societies.

Presented here are examples, from a global perspective, of opportunities for health co-benefits that could be realised by action in important greenhouse gas emitting sectors.[a]

Transport

Transport injuries lead to 1.2 million deaths every year, and land use and transport planning contribute to the 2–3 million deaths from physical inactivity. The transport sector is also responsible for some 14% (7.0 $GtCO_2e$) of global carbon emissions. The IPCC has noted significant opportunities to reduce energy demand in the sector, potentially resulting in a 15%–40% reduction in CO_2 emissions, and bringing substantial opportunities for health: A modal shift towards walking and cycling could see reductions in illnesses related to physical inactivity and reduced outdoor air pollution and noise exposure; increased use of public transport is likely to result in reduced GHG emissions; compact urban planning fosters walkable residential neighborhoods, improves accessibility to jobs, schools and services and can encourage physical activity and improve health equity by making urban services more accessible to the elderly and poor.

Electricity Generation

Reliable electricity generation is essential for economic growth, with 1.4 billion people living without access to electricity. However, current patterns of electricity generation in many parts of the world, particularly the reliance on coal combustion in highly polluting power plants contributes heavily to poor local air quality, causing cancer, cardiovascular and respiratory disease. Outdoor air pollution is responsible for 3.7 million premature deaths annually, 88% of these deaths occur in low and middle income countries. The health benefits of transitioning from fuels such as coal to lower carbon sources, including ultimately to renewable energy, are clear: Reduced rates of cardiovascular and respiratory disease such as stroke, lung cancer, coronary artery disease, and COPD; cost-savings for health systems; improved economic productivity from a healthier and more productive workforce.

Household Heating, Cooking and Lighting

Household air pollution causes over 4.3 million premature deaths annually, predominantly due to stroke, ischaemic heart disease, chronic respiratory disease, and childhood pneumonia. A range of interventions can both improve public health and reduce household emissions: a transition from the inefficient use of solid fuels like wood and charcoal, towards cleaner energy sources like liquefied petroleum gas (LPG), biogas, and electricity could save lives by reducing indoor levels of

Healthcare Systems

Health care activities are an important source of greenhouse gas emissions. In the US and in EU countries, for example, health care activities account for between 3–8% of greenhouse gas (CO_2-eq) emissions. Major sources include procurement and inefficient energy consumption. Modern, on-site, low-carbon energy solutions (e.g. solar, wind, or hybrid solutions) and the development of combined heat and power generation capacity in larger facilities offer significant potential to lower the