CLIMATE AND HEALTH COUNTRY PROFILE – 2015

MALAYSIA

World Health Organization

United Nations Framework Convention on Climate Change

OVERVIEW

Malaysia, with a population of 29 million[a], has had steady recent economic growth and succeeded in nearly eradicating poverty [World Bank, Country Overview, 2015]. In international climate discussions [COP21, Copenhagen], Malaysia announced a conditional voluntary target of up to 40% reduction in carbon intensity of GDP by 2020 compared to 2005 levels. Malaysia has also had a strong focus on the development of sustainable energy policies [see section 5].

Malaysia faces numerous potential threats to population health and development due to climate change. Communities living in coastal regions could be at risk of flooding due to sea-level rise. Climate sensitive diseases such as malaria, cholera and dengue as well as heat-stress are likely to rise with increased temperatures and changes in precipitation patterns.

SUMMARY OF KEY FINDINGS

- Under a high emissions scenario, mean annual temperature is projected to rise by about 4°C on average from 1990 to 2100. If emissions decrease rapidly, the temperature rise is limited to about 1.1°C.
- Under a high emissions scenario, and without large investments in adaptation, an annual average of 234,500 people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If 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 300 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.
- Under a high emissions scenario heat-related deaths in the elderly [65+ years] are projected to increase to almost 45 deaths per 100,000 by 2080 compared to the estimated baseline of under one death per 100,000 annually between 1961 and 1990. A rapid reduction in emissions could limit heat-related deaths in the elderly to just over 6 deaths per 100,000 in 2080.

OPPORTUNITIES FOR ACTION

Malaysia has adopted a National Policy on Climate Change which incorporates health perspectives. Currently Malaysia has a number of policies and plans which are responsive to climate change such as flood mitigation plans, fire suppression plans, etc.

Malaysia is taking steps to address the potential health impacts of climate change by managing the aspects of climate change that may affect public health. From time to time, response measures are also being established to avoid situations that will affect or worsen public health due to climate change impacts.

Malaysia is currently implementing projects on health adaptation to climate change, building institutional and technical capacities to work on climate change and health, and has conducted a national assessment of climate change impacts, vulnerability and adaptation for health. Country reported data [see section 6] indicate further opportunities for action in the following areas:

1) Adaptation

- Estimate costs to implement health resilience to climate change.

2) Mitigation

- Develop an Integrated Disease Surveillance and Response [IDSR] system with early warning for climate-sensitive health risks.
- Conduct valuation of co-benefits to health of climate change mitigation activities.

3) National policy implementation

- Formulate action plans and work programmes to support the implementation of policies related to climate change and health.

DEMOGRAPHIC ESTIMATES	
Population [2013][a]	29 million
Population growth rate [2013][a]	1.5%
Population living in urban areas [2013][b]	73.3%
Population under five [2013][a]	8.0%
Population aged 65 or older [2013][a]	5.4%
ECONOMIC AND DEVELOPMENT INDICATORS	
GDP per capita [current US$, 2013][c]	10,628 USD
Total expenditure on health as % of GDP [2013][d]	4%
Percentage share of income for lowest 20% of population [2009][c]	4.54%
HDI [2013, +/- 0.01 change from 2005 is indicated with arrow][e]	0.773 ▲
HEALTH ESTIMATES	
Life expectancy at birth [2013][f]	74 years
Under-5 mortality per 1000 live births [2013][g]	7.5

a World Population Prospects: The 2015 Revision, UNDESA [2015]
b World Urbanization Prospects: The 2014 Revision, UNDESA [2014]
c World Development Indicators, World Bank [2015]
d Global Health Expenditure Database, WHO [2014]
e United Nations Development Programme, Human Development Reports [2014]
f Global Health Observatory, WHO [2014]
g Levels & Trends in Child Mortality Report 2015, UN Inter-agency Group for Child Mortality Estimation [2015]

1 CURRENT AND FUTURE CLIMATE HAZARDS

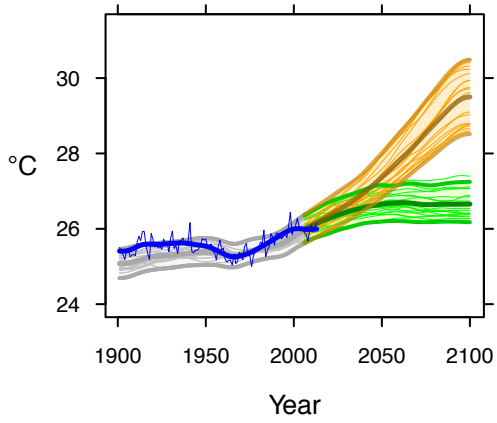
Due to climate change, many climate hazards and extreme weather events, such as heat waves, heavy rainfall and droughts, could become more frequent and more intense in many parts of the world.

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

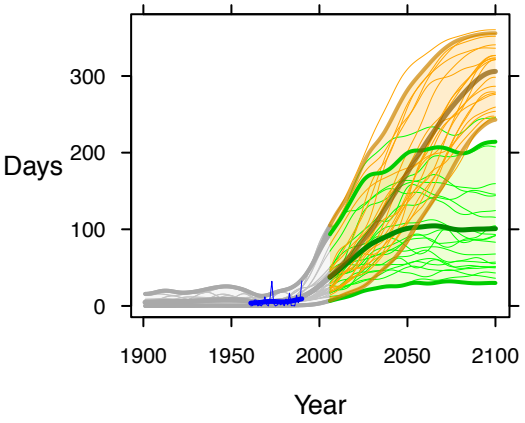
The model projections below present climate hazards under a high emissions scenario, Representative Concentration Pathway 8.5 [RCP8.5] (in orange) and a low emissions scenario, [RCP2.6] (in green).[a] The text boxes describe the projected changes averaged across about 20 models (thick line). The figures 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



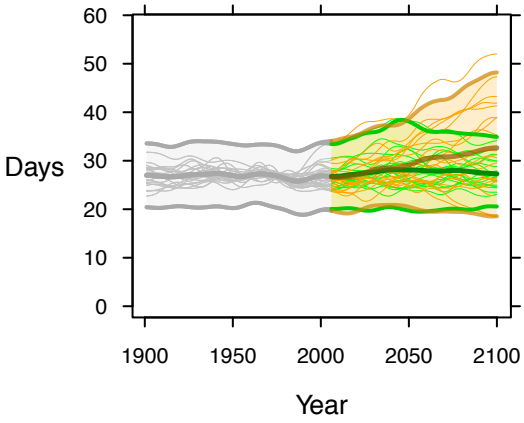
Under a high emissions scenario, mean annual temperature is projected to rise by about 4°C on average from 1990 to 2100. If emissions decrease rapidly, the temperature rise is limited to about 1.1°C.

DAYS OF WARM SPELL ('HEAT WAVES')



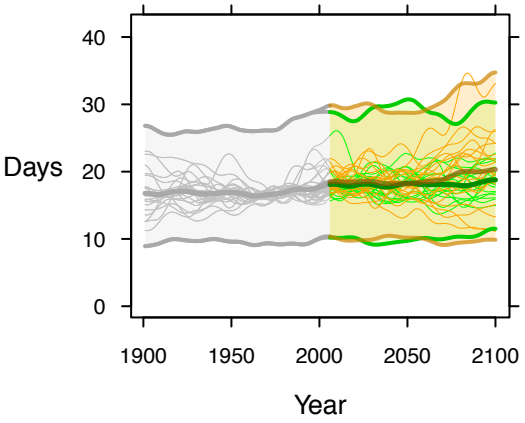
Under a high emissions scenario, the number of days of warm spell[d] is projected to increase from about 10 days in 1990 to about 300 days on average in 2100. If emissions decrease rapidly, the days of warm spell are limited to about 100 on average.

DAYS WITH EXTREME RAINFALL ('FLOOD RISK')



Under a high emissions scenario, the number of days with very heavy precipitation (20 mm or more) could increase by about 7 days on average from 1990 to 2100, increasing the risk of floods. A few models indicate increases well 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 both high and low emissions scenarios, the longest dry spell may increase by 2 or 3 days from an average of just under 20 days, with continuing large year-to-year variability.

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.

EXPOSURE TO FLOODING DUE TO SEA LEVEL RISE

Severity of climate change scenario →

	Without Adaptation	With Adaptation
RCP2.6	27,100	300
RCP8.5	234,500	600

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

Under a high emissions scenario, and without large investments in adaptation, an annual average of 234,500 people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If 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 300 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.

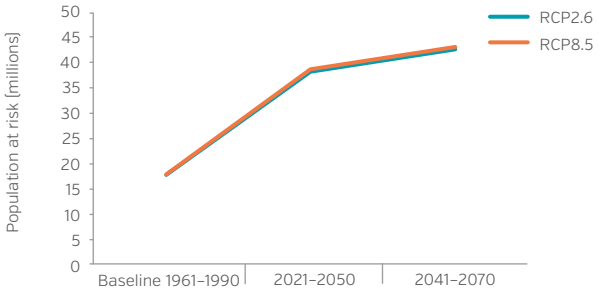
KEY IMPLICATIONS FOR HEALTH

Malaysia also faces inland river flood risk due to climate change. Under a high emissions scenario, it is projected that by 2030, 85,800 additional people may be at risk of river floods annually due to climate change and 89,300 due to socio-economic change above the estimated annual affected population of 307,700 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 Malaysia (in millions)



By 2070, under both emissions scenarios, approximately 43 million people are projected to be at risk of malaria compared to the estimated baseline of 17.6 million. Population growth can also cause increases in the population at risk in areas where malaria presence is static in the future.

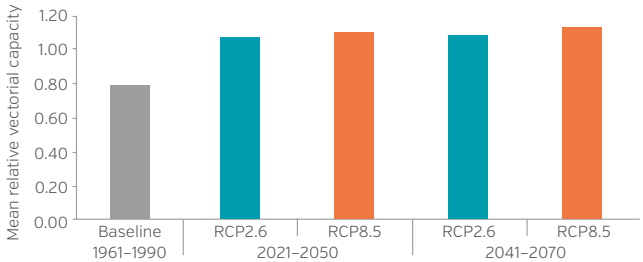
Source: Rocklöv, J., Quam, M. et al. 2015.[d]

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 Malaysia



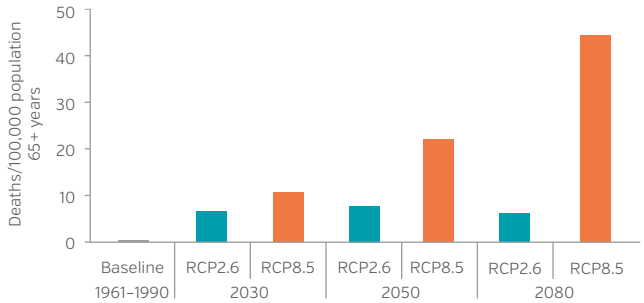
Under both high and low emissions scenarios, the mean relative vectorial capacity for dengue fever transmision is projected to increase from the baseline period towards 2070. Co-factors such as urbanization, development and population movements may modify the disease burdens associated with dengue, and make the disease cross new sub-national borders.

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

a World Resources Institute, Aqueduct Flood Analyser; Assumes continued current socio-economic development trends (SSP2) and a 10-year flood plan.
b Atlas of Health and Climate, WHO & WMO 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.

HEAT-RELATED MORTALITY

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



Under a high emissions scenario heat-related deaths in the elderly (65+ years) are projected to increase to almost 45 deaths per 100,000 by 2080 compared to the estimated baseline of under one death per 100,000 annually between 1961 and 1990. A rapid reduction in emissions could limit heat-related deaths in the elderly to about 6 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 to hunger and can lead to food insecurity. Vulnerable groups risk further deterioration into food and nutrition crises if exposed to extreme weather events.[b]

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

In Malaysia, the prevalence of child malnutrition in children under age 5 is 12.9% (2006).[c]

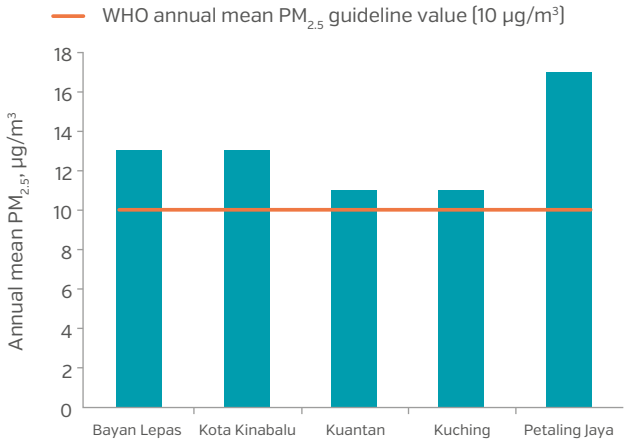
a Country-level analysis, completed in 2015, was based on health models outlined in the Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. Geneva: World Health Organization, 2014.
b World Food Project 2015 https://www.wfp.org/content/two-minutes-climate-change-and-hunger
c World Health Organization, Global Database on Child Growth and Malnutrition [2015 edition]. Child malnutrition estimates are for % underweight, defined as: Percentage of children aged 0–59 months who are below minus two standard deviations from median weight-for-age of the World Health Organization (WHO) Child Growth Standards.

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 cities in Malaysia annual mean $PM_{2.5}$ (µg/m³) 2012*



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 and diseases, lung cancer, and cardiovascular disease.

In 2012, the five most populated cities for which there was air pollution data available had annual mean $PM_{2.5}$ levels that were above the WHO guideline value of 10 µg/m³. Please note that the $PM_{2.5}$ converted values, presented here, are indicative only and are to be taken with care since conversion factors are approximative. As the $PM_{2.5}$ data is presumptive based on the application of a conversion factor applied as per the WHO Ambient Air Pollution Database methodology, the Government of Malaysia assumes no responsibility for any misunderstanding to readers and these values are not official Government of Malaysia estimates.

Source: Ambient Air Pollution Database, WHO, May 2014.

* The conversion of PM_{10} to PM_{25} values is based on a National conversion factor if available or regional conversion factor otherwise. National conversion factor is a city population-weighted conversion factor. The regional conversion factor is not population weighted.

SHORT LIVED CLIMATE POLLUTANTS

KEY IMPLICATIONS FOR HEALTH

Short-lived climate pollutants such as black carbon, methane and tropospheric ozone – released through inefficient use and burning of biomass and fossil fuels for transport, housing, power production, industry, waste disposal (municipal and agricultural) and forest fires – are responsible for a substantial fraction of global warming as well as air-pollution related deaths and diseases.

Since short-lived climate pollutants persist in the atmosphere for weeks or months while CO_2 emissions persist for years, significant reductions of SLCP emissions could result in immediate health benefits and health cost savings[a], and generate very rapid climate benefits – helping to reduce near-term climate change by as much as 0.5°C before 2050.[a]

In Malaysia, it is estimated that a reduction in SLCPs* could prevent 5,900 premature deaths attributed to outdoor air pollution per year, from 2030 onwards (Shindell, D., et al, Science, 2012).

*Through implementation of 14 reduction measures: 7 targeting methane emissions and the rest, emissions from incomplete combustion. See source for further detail.

a United Nations Environment Programme. Reducing Climate-related Air Pollution and Improving Health: Countries can act now and reap immediate benefits. http://www.unep.org/ccac/Media/PressReleases/ReducingClimate-relatedAirPollution/tabid/131802/language/en-US/Default.aspx

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

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