MADAGASCAR

HEALTH & CLIMATE CHANGE

COUNTRY PROFILE 2021

Small Island Developing States Initiative

World Health Organization

United Nations Framework Convention on Climate Change

CONTENTS

Acknowledgements

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EXECUTIVE SUMMARY

Despite producing very little greenhouse gas emissions that cause climate change, people living in small island developing States (SIDS) are on the front line of climate change impacts. These countries face a range of acute to long-term risks, including extreme weather events such as floods, droughts and cyclones, increased average temperatures and rising sea levels. Many of these countries already have a high burden of climate-sensitive diseases that are then exacerbated by climate change. As is often the case, nations at greatest risk are often under-resourced and unprotected in the face of escalating climate and pollution threats. In recent years, the voice of the small island nation leaders has become a force in raising the alarm for urgent global action to safeguard populations everywhere, particularly those whose very existence is under threat.

Recognizing the unique and immediate threats faced by small islands, WHO has responded by introducing the WHO Special Initiative on Climate Change and Health in Small Island Developing States (SIDS). The initiative was launched in November 2017 in collaboration with the United Nations Framework Convention on Climate Change (UNFCCC) and the Fijian Presidency of the COP23 in Bonn, Germany, with the vision that by 2030 all health systems in SIDS will be resilient to climate variability and climate change. It is clear though that building resilience must happen in parallel with the reduction of carbon emissions by countries around the world in order to protect the most vulnerable from climate risks and to gain the health co-benefits of mitigation policies.

The WHO Special Initiative on Climate Change and Health in SIDS aims to provide national health authorities in SIDS with the political, technical and financial support required to better understand and address the effects of climate change on health.

A global action plan has been developed by WHO which outlines four pillars of action for achieving the vision of the initiative; empowerment of health leaders to engage nationally and internationally, evidence to build the investment case, implementation to strengthen climate resilience, and resources to facilitate access to climate finance. In March 2018, Ministers of Health gathered in Mauritius to develop an action plan to outline the implementation of the SIDS initiative locally and to identify national and regional indicators of progress.

As part of the regional action plan, small island nations have committed to developing a WHO UNFCCC health and climate change country profile to present evidence and monitor progress on health and climate change.

This WHO UNFCCC health and climate change country profile for Madagascar provides a summary of available evidence on climate hazards, health vulnerabilities, health impacts and progress to date in the health sector's efforts to realize a climate-resilient health system.

KEY RECOMMENDATIONS

1 STRENGTHEN IMPLEMENTATION OF MADAGASCAR'S NATIONAL ADAPTATION PLAN FOR THE HEALTH SECTOR TO CLIMATE CHANGE

Madagascar has an adaptation strategic plan for health sector to climate change, which was published in May 2021. Implementation of the health and climate change plan in Madagascar is reported to be low. Assess barriers to implementation of the plan/strategy (e.g. governance, evidence, monitoring and evaluation, finance). Implementation can be supported by exploring additional opportunities to access funds for health and climate change priorities (e.g. GCF readiness proposal).

2 STRENGTHEN COLLABORATION TO CARRY OUT RESEARCH ON HEALTH AND CLIMATE CHANGE IN MADAGASCAR

Madagascar has a health and climate change working group, made up of key players in the health sector and the meteorological sector. This working group is headed jointly by the Director General of Meteorology and the health sector coordinator. Efforts should be made to strengthen collaborations with this health and climate change working group, to undertake and promote research on health and climate change in Madagascar.

3 UPDATE MADAGASCAR'S VULNERABILITY AND ADAPTATION CAPACITY ASSESSMENT

Madagascar published a vulnerability and adaptation capacity assessment in 2015. Efforts should be made to update this assessment.

4 ESTABLISH AN EFFECTIVE EARLY WARNING SYSTEM FOR HEALTH AND CLIMATE CHANGE RISKS AT THE HEALTH DISTRICT LEVEL

Climatic and meteorological information and parameters are used in Madagascar to produce and regularly distribute the climatology health bulletin. Effective early warning systems are required at the health district level regarding health and climate change risks.

5 BUILD CLIMATE-RESILIENT AND ENVIRONMENTALLY SUSTAINABLE HEALTH CARE FACILITIES

Measures can be taken to prevent the potentially devastating impacts of climate change on health service provision. A commitment towards climate-resilient, environmentally sustainable health systems can improve system stability, promote a healing environment and mitigate climate change impacts.

WHO RESOURCES TO SUPPORT ACTION ON THESE KEY RECOMMENDATIONS:

https://www.who.int/activities/building-capacity-on-climate-change-human-health/toolkit/

BACKGROUND

Madagascar is a large island nation, located off the eastern coast of Africa in the Indian Ocean. The highland plateau across the centre of Madagascar has created diverse ecosystems across the island *(1)*. Whilst the climate is generally tropical, there are significant regional variations. Most notably, it is largely wet in the north and east, and dry in the south and west *(2)*. Madagascar's economy is mostly dependent upon agriculture, fishery and livestock production. There are some development challenges in Madagascar, which make it increasingly vulnerable to climate change *(1)*. Furthermore, it is hit by tropical cyclones annually from December to May *(2)*.

Climate change is expected to cause rising temperatures, changing precipitation patterns (including flood and drought), sea level rise, and extreme weather events (including tropical cyclones). Indeed, many of these impacts are already being observed in Madagascar *(3)*. For human health, these changes are likely to incur significant burdens, such as food and water insecurity, displacement, and damage to public health systems *(1)*.

As a least developed country, Madagascar's greenhouse gas emissions are very small. Yet in their Nationally Determined Contribution (NDC), they commit to reducing their greenhouse gas emissions by 14% by 2030 compared with its business as usual scenario. Adaptation is a major priority for Madagascar, considering its high vulnerability to climate change. In terms of health adaptation, priority actions in the NDC include evaluating the links between climate change and the migration of vector-borne diseases and evolution of acute respiratory infections, and the implementation of early warning systems for health *(3)*.

CLIMATE HAZARDS RELEVANT FOR HEALTH

Climate hazard projections for Madagascar

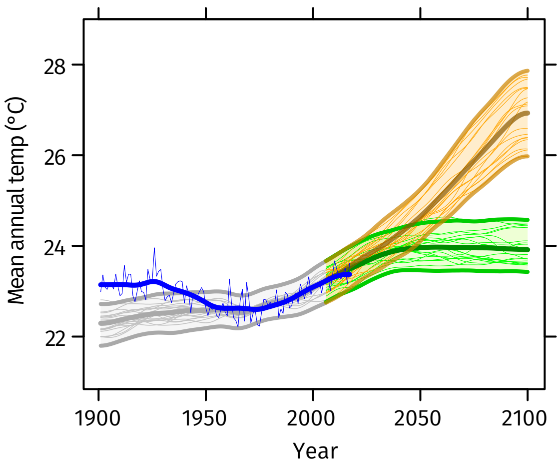
Country-specific projections are outlined up to the year 2100 for climate hazards under a 'business as usual' high emissions scenario compared to projections under a 'two-degree' scenario with rapidly decreasing global emissions (see Figures 1–5).

The climate 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 describes the projected changes averaged across about 20 global climate models (thick line). The figures[b] also show each model individually as well as the 90% model range (shaded) as a measure of uncertainty and the annual and smoothed observed record (in blue).[c] In the following text the present-day baseline refers to the 30-year average for 1981–2010 and the end-of-century refers to the 30-year average for 2071–2100.

Modelling uncertainties associated with the relatively coarse spatial scale of the models compared with that of small island States are not explicitly represented. There are also issues associated with the availability and representativeness of observed data for such locations.

Rising temperature

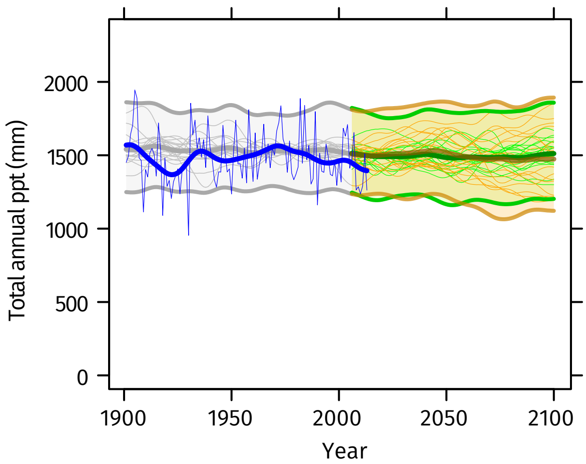
FIGURE 1: Mean annual temperature, 1900–2100



Under a high emissions scenario, the mean annual temperature is projected to rise by about 3.4°C on average by the end-of-century (i.e. 2071–2100 compared with 1981–2010). If emissions decrease rapidly, the temperature rise is limited to about 1°C.

Little change in total precipitation

FIGURE 2: Total annual precipitation, 1900–2100



Total annual precipitation is projected to decrease by about 4% on average under a high emissions scenario, although the uncertainty range is large (-20% to +11%). If emissions decrease rapidly, there is little projected change on average: a decrease of 2% with an uncertainty range of -10% to +5%.

NOTES

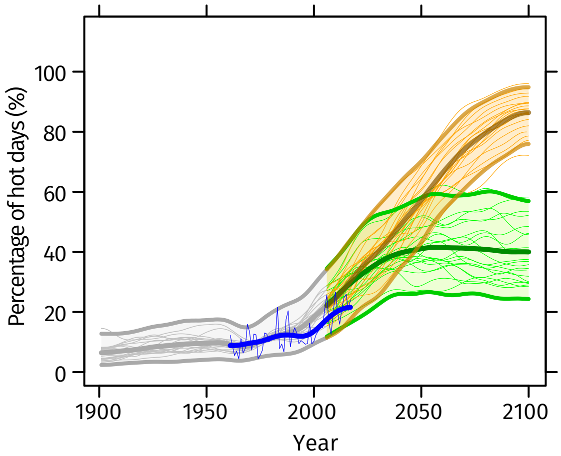
[a] Model projections are from CMIP5 for RCP8.5 (high emissions) and RCP2.6 (low emissions). Model anomalies are added to the historical mean and smoothed.

[b] Observed historical record of mean temperature is from CRU-TSv3.26 and total precipitation is from GPCC. Observed historical records of extremes are from JRA55 for temperature and from GPCC-FDD for precipitation.

[c] Analysis by the Climatic Research Unit, University of East Anglia, 2018.

More high temperature extremes

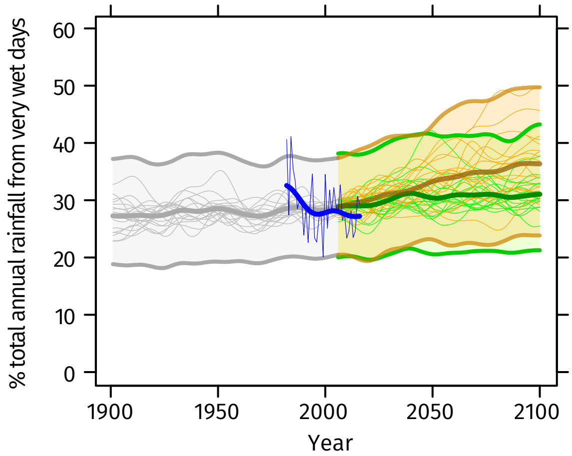
FIGURE 3: Percentage of hot days ('heat stress'), 1900–2100



The percentage of hot days[d] is projected to increase substantially from about 15% of all observed days on average in 1981–2010 (10% in 1961–1990). Under a high emissions scenario, about 80% of days on average are defined as 'hot' by the end-of-century. If emissions decrease rapidly, about 40% of days on average are 'hot'. Note that for the past few years the models tend to over-estimate the observed increase in hot days. Slightly larger increases are seen in hot nights[d] (not shown).

Increase in extreme rainfall

FIGURE 4: Contribution to total annual rainfall from very wet days ('extreme rainfall' and 'flood risk'), 1900–2100

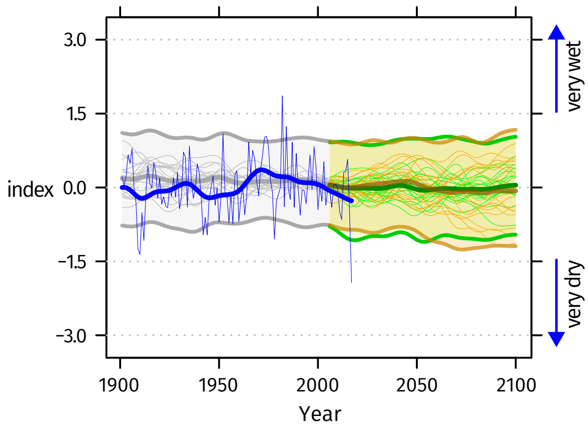


Under a high emissions scenario, the proportion of total annual rainfall from very wet days[e] (about 30% for 1981–2010) could increase by the end-of-century (to about 35% on average with an uncertainty range of about 25% to 50%), with little change if emissions decrease rapidly. These projected changes are accompanied by little or no change in total annual rainfall (see Figure 2).

FIGURE 5: Standardized Precipitation Index ('drought'), 1900–2100

The Standardized Precipitation Index (SPI) is a widely used drought index which expresses rainfall deficits/excesses over timescales ranging from 1 to 36 months (here 12 months, i.e. SPI12).[f] It shows how at the same time extremely dry and extremely wet conditions, relative to the average local conditions, change in frequency and/or intensity.

SPI12 values show little projected change from about zero on average, though year-to-year variability remains large. A few models indicate slightly larger decreases (more frequent/intense dry/drought events) or increases (more frequent/intense wet events).[f]



[d] A 'hot day' ('hot night') is a day when maximum (minimum) temperature exceeds the 90th percentile threshold for that time of the year.

[e] The proportion (%) of annual rainfall totals that falls during very wet days, defined as days that are at least as wet as the historically 5% wettest of all days.

[f] SPI is unitless but can be used to categorize different severities of drought (wet): above +2.0 extremely wet; +2.0 to +1.5 severely wet; +1.5 to +1.0 moderately wet; +1.0 to +0.5 slightly wet; +0.5 to -0.5 near normal conditions; -0.5 to -1.0 slight drought; -1.0 to -1.5 moderate drought; -1.5 to -2.0 severe drought; below -2.0 extreme drought.

Tropical cyclones

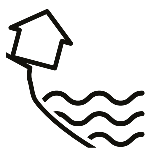
It is anticipated that the total number of tropical cyclones may decrease towards the end of the century. However, it is likely that human-induced warming will make cyclones more intense (an increase in wind speed of 2–11% for a mid-range scenario (i.e. RCP4.5 which lies between RCP2.6 and RCP8.5 – shown on pages 4–5) or about 5% for 2°C global warming). Projections suggest that the most intense events (category 4 and 5) will become more frequent (although these projections are particularly sensitive to the spatial resolution of the models). It is also likely that average precipitation rates within 100 km of the storm centre will increase – by a maximum of about 10% per degree of warming. Such increases in rainfall rate would be exacerbated if tropical cyclone translation speeds continue to slow *(4–11)*.[a]

POTENTIAL FUTURE CHANGES IN TROPICAL CYCLONES: A GLOBAL PERSPECTIVE *(4–11)*[a]

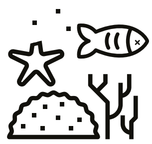
Sea level rise

Sea level rise is one of the most significant threats to low-lying areas on small islands and atolls. Research indicates that rates of global mean sea level rise are almost certainly accelerating as a result of climate change. The relatively long response times to global warming mean that sea level will continue to rise for a considerable time after any reduction in emissions. The continuing rise in sea level means that higher storm surge levels can be expected regardless of any other changes in the characteristics of storm surges.

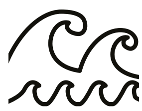
Potential impacts of sea level rise include



Coastal erosion



Ecosystem disruption



Higher storm surges

云报告 https://www.yunbaogao.cn

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_23576