Climate Change Mortality Risk: The impact of climate change on future mortality in South Africa

By Chris Falkous

Recent estimates from the World Economic Forum (WEF), made in collaboration with Oliver Wyman, suggest that cumulatively by 2050 climate change could lead to an extra 14.5 million deaths worldwide under a "middle of the road" greenhouse gas emissions scenario, driven by floods, droughts, heatwaves, and tropical storms.[1]

To a first-order approximation, the WEF/Oliver Wyman estimates imply that annual average global mortality rates could increase by around 1%. Vulnerability to these climate change risks varies by region, so it can be expected that if the average impact is 1%, some regions will see a significantly higher increase in mortality rates.

Africa is expected to be affected by most of the risks associated with climate change. The WEF analysis points to the vulnerability of middle Africa to floods, southwestern Africa to droughts, and southern and western Africa to heatwaves.

Given the importance of the insurance market in South Africa, RGA reviewed the academic literature to assess the possible impact climate change could have on future mortality in South Africa by 2050 under the SSP2-4.5 "middle of the road" emissions scenario. This article provides a summary of that analysis.

Summary of physical risk impacts

Table 1 summarizes RGA's analysis of how, according to current academic literature, the mortality impact of physical risks related to climate change might change by 2050 in a "middle of the road" 1ºC warming scenario in South Africa.

The analysis explores a range of climate-related factors, noting only slight increases in mortality risk from several of those factors and a decrease in mortality risk from at least one of them (air pollution from coal power stations – due to a planned transition to renewable energy). For a breakdown of how these figures were derived, view the full report.

For certain other climate-related factors, mortality risk in South Africa is relatively insignificant now and will remain so for the given climate change scenario. For example, consider this statistic as is relates to risks from storm surges and sea level rise: A 2010 assessment estimated that only around 0.16% of the population of South Africa (roughly 100,000 people), live within 5m of sea level.[2] Contrast that with around 30% of the population of Florida in the United States (around 7.4 million people) living at less than 2m of sea level.[3]

Unfortunately, the lack of sufficient research prevents quantification of the potential change for the two risks with the largest estimated current population impact:

- Sources of air pollution other than coal power stations and wildfires, which might be expected to reduce annual population deaths through general efforts to improve air quality
- Food insecurity, which might be expected to increase annual population deaths through diminished crop yields due to increasing temperatures, droughts, floods, and storms

Table 1: Summary of Physical Risk Impacts of Climate Change in South Africa

Physical Risk	Estimated Current Population Impact: Current annual population dealth estimated to be attributable to risk	Potential change in population impact by 2050 in 1°C warming scenario: Increase/(reduction) in annual deaths estimated to be attributable to risk.
Average temperatures		
• Cold-related	3.0%	+0.1%
• Heat-related	0.4%	+0.1%
Air pollution		

• Coal power stations	0.4%	(0.3%)
• Wildfires	1.0%	+0.2%
• Other	4.6%	?
Droughts	-	-
Floods (extreme rain)	<0.2%	<+0.2%
Food insecurity	5%	?
Vector-borne disease	<0.1%	<+0.1%
Tropical cyclones	-	-
Storm surges (coastal floods)	-	-
Sea level rise	-	-
Overall physical risk impact (for quantified risks)		<0.4%

> Based on around 500,000 annual population deaths currently experienced in South Africa, physical risks associated with climate change under this scenario would account for fewer than an additional 2,000 annual population deaths.
>
> However, this does not capture anticipated population growth over the period to 2050 and, except for the impact on average temperatures, the anticipated aging of the population.

On the positive side, risks associated with the transition to a lower carbon economy have the potential to improve health:

- According to Hamilton et al, sustainable food and agriculture policies may, if designed and implemented appropriately, encourage people

to eat a calorie-balanced diet that is high in plant-based nutrition and could help prevent an estimated 150 deaths per 100,000 population in South Africa (90,000 for a population of 60 million) in a sustainable pathway scenario (SPS), which is broadly equivalent to the 2015 Paris agreement.

- Sustainable travel and transport policies may encourage people to walk or cycle instead of using their cars and may help prevent an estimated 30 deaths per 100,000 population in South Africa (18,000 for a population of 60 million) in an SPS scenario.

Caveats and other considerations

Climate science has improved markedly over recent decades, but significant uncertainty remains. That said, even doubling or tripling the impacts of each risk to account for uncertainty would still lead to a relatively modest overall physical impact in South Africa in the given scenario. It is important to acknowledge, however, that considerations outside of the scope this paper could also play a significant role:

Future impact on mortality

This analysis focuses on the direct mortality impacts of physical risks, but these physical risks could cause new onset morbidity that may lead to negative mortality impacts further into the future.

Severe weather

Severe weather events that do not have a significant direct mortality impact can still have significant negative economic impacts and severely damage infrastructure, both of which could lead to negative health consequences and, ultimately, higher mortality.

Migration from other countries

Other countries in southern Africa may see greater impacts, which may lead to inward migration into South Africa that could put strain on public services such as healthcare.

Interactions between risk

This analysis considered each physical risk in isolation, but the reality is more complex and interactions between risks increase uncertainty. There is also

the risk of reaching climate tipping points, which could lead to a self-reinforcing cycle of increased greenhouse gas emissions and warming.

Animal interactions

Some of the actions that have led to climate change, such as deforestation, bring humans and animals closer into contact, which increases the risk of zoonotic disease transmission and increases the risk of future pandemics.

Conclusion

This analysis set out to review the academic literature to assess the possible impact climate change could have on future mortality in South Africa by 2050 under the SSP2-4.5 "middle of the road" emissions scenario. Over longer periods and in higher emissions scenarios, the mortality impact could be greater.

For those physical risks where the change could be estimated, the overall impact was relatively modest, with annual population deaths potentially increasing by less than 0.4%. In addition, this impact would be reduced by adaptation measures taken to mitigate the mortality impact of these physical risks. This potentially surprising result may be counter to expectations of a more significant impact, although we need to recognize the uncertainties involved.

> The modest negative mortality impact from physical risks in South Africa outlined here does not absolve society from taking action – both in South Africa and globally – to limit greenhouse gas emissions and future climate change impacts.

Climate change remains a significant risk factor and a priority issue that must be addressed through collective action at the government, corporate, and individual levels. The insurance industry has an opportunity to play a leadership role in combating the climate crisis by promoting awareness, providing education, and inspiring, motivating, and incentivizing populations

to modify behaviors in ways that will benefit their own health and the planet's health.

RGA has made all reasonable efforts to ensure that the information provided in this publication is accurate at the time of inclusion and accepts no liability for any inaccuracies or omissions.

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