Climate Change Implications for SA's Youth

What will basic lifestyles and services look like from 2021 onwards, through 2030, 2040, and beyond for today's children and future generations?

Nicholas King – Expert Report

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Executive Summary

The science of climate change is unequivocal - it is happening, it is anthropogenic in cause and we are currently on 'worst case' trajectories (IPCC 2021). This worst-case trajectory is the unabated, 'business as usual' trajectory, or scientifically, Representative Concentration Pathway (RCP) 8.5[1] which in terms of global surface temperature represents a 3-4°C+ increase above the 20 th century average temperature, by around mid-century. Given the current state of political negotiations and actions, it is currently the most probable scenario for predicting the extent and timing of future climate impacts. However, even 'best case' scenarios have us reaching 1.5°C within 10-20 years, given the greenhouse gases (GHG) already emitted and 'committed to' in terms of near-term future emissions.

Southern Africa, an already warm, sub-tropical, and semi-arid region, will be harder hit than temperate regions, and South Africa, despite being the most developed country in the Southern African Development Community (SADC), will suffer enormous negative physical, socio-economic and ecological impacts, under all scenarios. These will include extreme heat stress, extreme weather events, including storms, flooding and droughts, sea-level rise and coastal damage, crop failures and food insecurity, water stress, disease outbreaks, various forms of economic collapse and social conflict and mass migration to informal settlements around urban areas. Impacts do not rise linearly with rising temperature, but with an ever-steepening curve, rapidly making large parts of the interior of the country, as well as vulnerable low-lying coastal areas, uninhabitable. All of these impacts together will dramatically alter the lives and prospects for today and tomorrow's youth, who will suffer significant harms, in a combination of detrimental physical health and wellbeing, mental trauma, social upheaval and reduced opportunities for self-advancement.

The difference between 1.5°C, 2°C or 3-4°C+ average global heating increases may appear marginal. In fact, they represent vastly different scenarios for the future of humanity. Projected changes in extremes are larger in frequency and intensity with every additional increment of global heating. Any additional GHG emissions exacerbate global heating, thus all mitigation actions will help reduce these negative outcomes, and must be actively pursued by governments. Any further delays means mitigation becomes increasingly difficult to achieve at the scales required, consigning today's youth and future generations to significantly more harmful climate impacts.

[1]Note that the IPCC AR6 WG1 report 2021 now uses 'Shared Socio-economic Pathways' (SSPs) scenarios rather than RCPs; however, for consistency with the other specialist reports referred to, I retain the term RCP here. RCP8.5 equates to SSP5-8.5, the 'worst-case' scenario

Purpose of this report:

This report provides an expert interpretation of a number of recent specialist reports on climate change as regards impacts on lives, livelihoods and lifestyles from 2021 onwards, through 2030, 2040 and beyond for today's and tomorrow's youth. In addition, it makes reference to the very latest climate science as published on August 9, 2021 by the Intergovernmental Panel on Climate Change (IPCC)'s Working Group 1[2], and specifically the new regional fact sheets[3], as well as the 2021 UNICEF report **The climate crisis is a child rights crisis**, in which a Children's Climate Risk Index (CCRI) is introduced for the first time (UNICEF 2021a; b). Through their CCRI risk analysis, UNICEF estimates close to one billion children around the world, almost half of all children, to be at "extreme risk" from climate impacts.

Language of certainty of likelihood:

The following figure outlines the levels of confidence attributed to specific terms utilised in this report to convey the certainty of probable outcomes. It is adopted from the guidance for authors developed initially by the Intergovernmental Panel on Climate Change (IPCC), further developed by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) for all assessments, and finally by the Scientific Advisory Panel for UNEP's Sixth Global Environmental Outlook (GEO6), the most comprehensive, multi-year scientific assessment of all global environmental trends and projections for the future conducted to date.

[2]The Working Group I contribution to the IPCC's Sixth Assessment Report addresses the most up-to-date understanding of the climate system and climate change, bringing together the latest advances in physical climate science.
[3] IPCC AR6 WG1 Regional fact sheet – Africa, specifically detail for east (ESAF) and west southern Africa (WSAF).

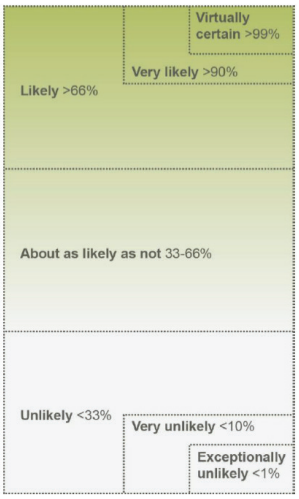


Figure 1:

Likelihood scale for the quantitative communication of the probability of an outcome occurring.
For grammatical correctness, where required, virtually certain is interchanged with almost certainly. Adapted from UNEP 2019. Global Environmental Outlook 6. Scientific Advisory Panel Guidance for Authors.

Overview of ongoing climate change impacts for South Africa

Whilst the extent, timing and severity of predicted climate change impacts vary depending upon the cumulative volume of global greenhouse gas (GHG) emissions – the greater the emissions, the greater the impacts - under all emission scenarios, it is virtually certain that:

(a) average global temperatures will continue to rise and South Africa will experience more frequent and greater heat extremes;

(b) a hotter, drier climate overall predicates:

* greatly extended periods of 'drought' (i.e. below historical annual average rainfall), with severe implications for agriculture and all social and economic activity;
* together with greater wind speeds and wind events, more extreme fire risk across the country;
* extreme heat stress for all outdoors activities, most especially manual labour;
* increased spread and outbreaks of zoonotic diseases, impacting people, crops, livestock, and wildlife;

(c) extreme rainfall events will become more frequent and more intense, with severe implications for water availability, water quality and vulnerable infrastructure; such events increasingly are beyond historical infrastructure design specifications, and have the potential to cause significant disasters e.g. destruction of major energy, water, housing and transport infrastructure, including bursting of large dams;

(d) sea levels will continue to rise throughout the 21st century at least, accompanied by increased frequency and magnitude of storm surge events, with severe implications for coastal zones and infrastructure;

(e) oceans around South Africa will continue to warm and become more acidic, with severe implications for marine living organisms and attendant economic activities;

(f) an increase in the occurrence of compound extreme events will occur.[4]

Key concerns regarding direct impacts of these physical changes:

1. Freshwater:

As a semi-arid country, freshwater is already South Africa's most limiting resource in terms of development options. Climate change exacerbates these limitations. For future generations, increasing conflict over scarce water will almost certainly arise, with those communities already unserved, remaining unserved. Conflicts will also very likely arise with neighbouring countries over shared river-basin resources and diminishing supplies. With rising number and severity of extreme weather events, floods will occur more often, damaging water infrastructure, affecting quality and precipitating disease outbreaks. Together with ongoing rising temperatures and drought conditions, it is virtually certain that these events will collapse crop production, kill livestock and greatly exacerbate food insecurity. Girls and women who traditionally are tasked with fetching water for their families, will spend more time sourcing and fetching water, with all the attendant negatives associated thereto e.g. missed schooling for girls, insecurity and risks of violence.

2. Food security:

Rising temperatures inducing prolonged drought will lead to reduced levels of soil moisture reducing plant growing days; combined with heat stress making agricultural labour untenable, this will negatively impact the full spectrum of the agricultural sector through reduced crop and livestock production, and declines in rural incomes. This directly affects the wellbeing of rural communities and the mental health of farmers. In addition, globally, sudden shocks in food production systems have been increasing, with the major driver of these increases being extreme climate events. In South Africa, extreme events such as hailstorms, floods and heat stress will almost certainly increasingly destroy crops and kill livestock.

[4] Compound extreme events are the combination of multiple hazards e.g. concurrent heatwaves and droughts, compound flooding (e.g., a storm surge in combination with extreme rainfall and/or river flow), compound fire weather conditions (i.e. a combination of prolonged hot, dry, and windy conditions), or concurrent extremes at different locations. (IPCC 2021).

Warmer temperatures enable greater pest and disease productivity and outbreaks on crops, livestock and wildlife will almost certainly increase. Food insecurity will rise, and children will very likely suffer most from hunger and malnutrition, and have to spend longer hours assisting with food production and/or procurement, most especially girls. However, extreme heat will reduce the ability to work outdoors and extreme heat waves will lead to rising numbers of morbidities and mortalities, especially amongst the most vulnerable i.e. the young, the infirm and the elderly. Opportunities for children's schooling, especially girls, will increasingly be adversely affected, setting back gender equity gains.

3. Fire:

Similar to semi-arid regions elsewhere subject to regular wildfires naturally, South Africa has already and will almost certainly experience rapidly increased probability of fire risk conditions in most areas, with increased penetration in areas not normally associated with fires such as the forests of the east coast and interior mountain ranges. Informal settlements will be particularly vulnerable to increasing fire risk, destroying dwellings and livelihoods and killing people. Children will be most vulnerable to these traumatic events.

4. Infrastructure:

Public service infrastructure such as roads, water and sanitation, health, education and electricity services will very likely be continuously damaged by extreme events, becoming increasingly costly and unaffordable to repair and replace. As these stresses on infrastructure compound, service delivery will almost certainly decline, especially access to electricity and water, and health and education services for children. Disaster relief will be increasingly over-stretched and unable to reach most people. Private infrastructure such as houses, businesses and farm buildings will be damaged, destroying livelihoods. Insurance costs will rise, becoming unaffordable for many.

5. Coasts and Oceans:

Temperature increases in the oceans together with acidification will negatively impact marine living resources. These will mostly shift ranges and/or die out, affecting the livelihoods of all who depend on them directly for food and income. In addition, collapse of coral reefs and other marine and coastal tourist attractions such as penguin, shark and whale watching will very likely close this sector. Most associated jobs will likely be lost. Rising seas levels exacerbated by increasing storm surges will almost certainly inundate coastal areas, estuaries and coastal infrastructure. As evidenced in other countries, government at all levels will very likely be unable to overcome the public resistance to implementing the required 'managed retreats' away from the coastline. However, insurance companies will no longer insure private property below the proposed new setback lines, causing mayhem in the property market.

In particular, the most expensive coastal properties, often owned by wealthy foreigners, will likely rapidly become uninsurable and worthless. Numerous court cases will likely arise as to who is liable for redress, tying up scarce national resources.

6. Emotional wellbeing and climate-induced migration:

Huge emotional trauma will be experienced, induced by physical, social, economic and cultural disruption. The increasing inability to cope with climate impacts, and the knowledge that government services are overwhelmed and unable to help, will almost certainly create feelings of abandonment, hopelessness and depression amongst a growing proportion of the populace. Many people will likely lose their sense of place and identity through dramatic changes in their surroundings, the breakdown of social ties and cultural connections as they are forced to move, to try and survive and access services such as health care, education and social grants. Informal settlements will expand dramatically, including with in-migration from countries to the north as climate change impacts compromise livelihoods across the region, with conflicts and xenophobia leading to violence. All of this will reduce people's economic status and compromise their physical and mental wellbeing. Children in particular, will be traumatised at these upheavals and the inability of their parents to provide for them, and their health and safety. The expressed and visible angst amongst their adult family 'safety net' will induce considerable stress in the children, together with disruptions to their social networks, schooling, recreation and all other opportunities.

7. Childrens' Vulnerability:

These impacts cannot be over-stated. UNICEF, in their just released Children's Climate Risk Index (UNICEF 2021b) rate the climate risks to children in South Africa as 'medium-high'.
This 'medium-high' rating is the lowest category of risk for any sub-Saharan Africa country, most of which are in the two higher risk categories ('high'; 'extremely high') due to their weaker economies and greater resource constraints in dealing with climate impacts.[5]

[5] The Children's Climate Risk Index (CCRI) provides new evidence and analysis on how many children are currently exposed to climate and environmental hazards, shocks and stresses. A composite index, the CCRI brings together geographical data by analysing 1.) exposure to climate and environmental hazards, shocks and stresses; and 2.) child vulnerability. The CCRI helps to understand and measure the likelihood of climate and environmental shocks or stresses leading to the erosion of development progress, the deepening of deprivation and/or humanitarian situations affecting children or vulnerable households and groups.

8. Economic Impacts and Constraints:

For less developed countries such as South Africa, with already constrained fiscal resources, disaster response, relief work and rebuilding will very likely overwhelm the state's ability to respond adequately, compromising every aspect of future service delivery and socio-economic wellbeing. For an example of just how costly addressing climate impacts is (and which will increasingly rise),the amounts in drought relief fund allocations (just one expense) across the country for each of the past 5 years are given. These were R212m, R162m, R265m, R300m, and R51m, or a massive R990m in total. The current allocations in progress across the country amount to an additional R138m.[6] Addressing rising disaster relief costs and rebuilding will become increasingly unaffordable for a country with an already weak economy, massive unemployment and the world's greatest inequality[7] and the ensuing growing social support demands.

Local geographic similarities and differences:

From here, I interpret briefly how these general impacts will very likely be experienced in three different geographic and physical locations in the country, where they may manifest somewhat differently on the ground, and over time, given local contexts. The IPCC's Special Report 2018, and the most recent (August 2021) Working Group 1 component of the IPCC's Sixth Assessment Report explicitly spell out that, whilst the difference between 1.5°C, 2°C or 3°C+ average global heating can sound marginal, in fact, they represent vastly different scenarios for the continuation of current ways of life at any given location (see Table 1 for examples). The local geographic differences are summarised in Table 2.

[6] See Parliamentary Questions and Answers of 16 October 2020 for further details and breakdown: https://cer.org.za/wp-content/uploads/2021/09/RNW2342-2020-11-26.docx

[7] South Africa's GINI co-efficient, the global statistical measure of the income or wealth inequality within a country is estimated to be the world's highest.

Table 1: Examples of dramatic, non-linear increases in climate impacts through rising global temperature scenarios. (Adapted from IPCC 2018; 2021).

Rise in global average temperature:	+1.5°C	+2°C	+3°C+
Probability of impacts:			
Ice-free Arctic summer in any given year (%)*	3% (1 in every 30 yrs)	16% (1 in every 5-6 yrs)	63% (2 out of every 3 yrs)
Average length of droughts (months)	2 months	4 months	10 months
Average increase in frequency of historical once-in-10 yr drought	1 every 5yrs	1 every 4yrs	1 every 2,5yrs
Mammal species losing half their habitat (%)	4%	8%	41%
Increase in area burnt by wildfire in average Mediterranean summer (%)	+41%	+62%	+97%
Mean sea level rise by 2100 (cm)	+26 – 77cm	+30 – 92cm	>1m, but too many uncertainties for ascribing an upper limit
Extreme flood risk (% increase)	+100%	+170%	>+170% but too many uncertainties for ascribing an upper limit
Loss of coral reefs globally (%)	-70%	-100%	n/a, no longer exist

* An ice-free Arctic has significant implications for global climate, including seasonal extreme weather events, changes in ocean circulation, and increased global warming through loss of the 'albedo effect' of reflecting sunlight off light-coloured ice rather than heat absorption by darker seawater

Western Cape (and coastal impacts for other vulnerable coastal areas):

2021 - 2040: Water for basic needs will almost certainly become increasingly unavailable in the Western Cape. Whilst desalination may provide a short- to medium-term option, in the longer term the vulnerability of coastal infrastructure to extreme storm events will very likely negate this option. Residents of massively expanding informal settlements such as Khayalitsha will spend much of their days waiting in queues at standpipes where these exist, or paying exorbitant prices for tanker water.

Personal health will very likely be compromised by poor sanitation. The majority of residents will likely suffer from multiple illnesses, including spread of poverty-linked illnesses such as TB. Health services, where they exist, will very likely be overwhelmed by the sick, malnourished, and the injured from the many social conflicts. (Currently, the ongoing and future prevalence of COVID19 and/or other zoonotic outbreaks is unquantifiable, but as likely as not to be a significant factor in terms of public health, and availability of over-stretched health services). Service provision will become increasingly difficult, being unable to keep up with the rapidly expanding settlements as people migrate in from across the sub-continent, driven off the land by climate impacts and social disruption. Xenophobia will very likely increase and children will suffer serious trauma and harms in exposure to violence, cultural disconnection and physical displacement.

Much of the Western Cape economy, dependent on agriculture, including wine-farming, and tourism, will very likely be severely reduced, compromising farm work opportunities and those across the tourism and hospitality sectors. Increasingly, the biodiversity attractions of the Cape Floral Kingdom will be lost due to the increasingly unsuitable climate envelope and associated extreme weather events, including extreme fire outbreaks, reducing the tourism potential of the region and exacerbating unemployment and economic hardships.

2041 – 2060:

It is very likely that climate impacts will have devastated the agricultural sector in the Western Cape, including viticulture, and the tourism and hospitality sector, given the collapse of wine-farming, coastal zone attractions, and loss of the Cape Floral Kingdom. Coastal property prices are likely to have collapsed due to sea-level rise and storm-surge coastal erosion and damage to property and transport networks along the coastline. The provincial economy will likely struggle to cope with rapidly rising social demands alongside collapse of the traditional economic sectors. Water and sanitation provision, and health services will become increasingly scarce and diseases rampant. Children will struggle to participate in educational activities, through economic hardship, social disruption and their own health and wellbeing problems. Social conflict will almost certainly rise everywhere as people struggle to get by, exacerbated by the constant in-flow of climate refugees from elsewhere.

Informal settlements around Cape Town such as Khayalitsha will very likely house vastly more people, yet in almost the same limited space as 2030 as expansion is constrained by the advancing coastline, the wetlands of the Cape Flats expanding from rising seawater intrusion and encroachment from more formal urban development as the city attempts to implement managed retreat away from much of the eroding coastline. The newcomers, mostly climate migrants who have abandoned the rural areas last, as agriculture completely collapses, disabling even the barest of subsistence farming, will have very few economic opportunities. They will almost certainly be dependent on social networks and social grants where these exist and otherwise unable to contribute to financial wellbeing with unemployment rife and opportunities scarce. Healthcare services are very likely to be almost non-existent in these compacted settlements, and most inhabitants will very likely be compromised physically from lack of access to water and sanitation, malnutrition and numerous infectious diseases, and suffering severe mental trauma from insecurity and financial stress, and the daily struggle to survive. Fire risks will be prevalent all year round. The young adults who were children in 2030 will very likely be severely traumatised, with compromised health and education, unable to see any role and future for themselves. Many will likely turn to crime, drugs and gangs to survive and depressions will cause suicide rates to rise.

Limpopo/Lephalale

2021- 2040:

the climate warming in the already drier and hotter interior that is occurring faster than elsewhere, will almost certainly deliver significant negative impacts on livelihoods. Local

communities will very likely no longer be able to depend on rain-fed agriculture and rangeland grazing for livestock, and rainfall that does come will increasingly come in extreme events, including devastating hailstorms and tornadoes destroying crops, killing livestock and people and damaging homes and buildings. As a result, food insecurity will very likely quickly become a major cause of socio-economic stress. Commercial farmers will likely struggle to obtain sufficient irrigation water, and conflict over water use and allocations will rise. It is very likely that service delivery protests in this region will shift focus to also include protesting against big water users such as mines, power stations and commercial farming as people struggle to obtain water for domestic use against a backdrop of rapidly rising temperatures and extended drought regimes.

Overall, less water means that water quality also decreases in a warmer, drier South Africa, and the spread of water-borne diseases, most especially diarrhoea, already the biggest killer of under-5-year old children, will almost certainly increase. The boreholes which have been drilled everywhere in the drier interior will very likely rapidly dry-up as the water-table is drawn down by over-use and lower rainfall is no longer able to replenish the aquifers. The hotter temperatures mean that working outdoors is more difficult, adding to physical harms and food insecurity. During the increasingly intense heat waves, it will very likely be almost impossible to work in the fields or do other manual labour. Many of the most vulnerable – children, the elderly and the infirm - will likely succumb to heat stress during extreme heat events as they have few options to avoid the heat. For many people, these personal losses will be compounded by the feelings of inability to cope with their changing lives, especially for parents with young children now suffering from malnutrition and severe illnesses, and for whom 'normal' daily lives are impossible. Children will almost certainly suffer severe mental trauma in these circumstances.

Extreme storm events, including floods will very likely wash away houses and transport infrastructure such as bridges, collapsing road transport and further isolating communities in the Lephalale region from immediate disaster relief, and longer term to work, schooling and health care.The surrounding bushveld will almost certainly dry out dramatically, exacerbating fire risks and damage to life and property. Changes to the biodiversity landscape mean that even traditional coping mechanisms such as foraging for bushmeat are no longer viable options, and it will likely become almost impossible to find the medicinal plants many people still rely on. Unpalatable invasive species will very likely take over the bushveld used for grazing, compromising even the barest of subsistence farming, with livestock increasingly unproductive due to food, water and heat stress.

2041-2060:

The ongoing multi-year 'droughts' will almost certainly prevent any further rain-fed agriculture, and very likely collapse almost all commercial agricultural enterprises and even the game farms will likely lose most of their wildlife as these cannot move beyond the fences. Many farmworkers will very likely lose their jobs and unemployment will be rife, leading to severe social conflicts and necessitating migration to the cities. Availability of water for even domestic purposes will almost certainly be highly contested, pitting people's needs against industry and agriculture. Temperatures will almost certainly be too hot to work outdoors for most of the year, curtailing almost all agricultural fieldwork and manual labour.

Mpumalanga/eMalahleni:

2021-2040:

All the same climate impacts experienced in Limpopo will undoubtedly also manifest in Mpumalanga. However, this region will also experience some additional impacts, most notably air pollution from the existing extensive mining and burning of coal, and relative geographic proximity to the cyclone-prone, sub-tropical coastline of Mocambique.

Air pollution from coal-mining and coal-burning on the Mpumalanga highveld will almost certainly continue, at least in the short-term, causing significant respiratory illness amongst local people, including the work force, but especially children, compromising their health and compounding the co-morbidities that climate stress will bring, e.g. heat stress, and compromised water availability, water quality and access to sanitation. The functioning of these plants will however become increasingly physically compromised through water restrictions and heat stress, and extreme event disruptions,[8] as well as the political pressure to decommission early.

In addition to the extreme weather events projected for the highveld, tropical cyclones will very likely extend increasingly further inland, bringing devastating flooding to the Mpumalanga highveld and east coastal belt with significant destruction of infrastructure, socio-economic disruption and loss of lives. Each of these events will individually and cumulatively create significant potential physical harms as well as mental trauma on all, but especially the most vulnerable such as children, who will also suffer related health issues and lost educational opportunities. As these storms intensify, the impacts are likely to outstrip those of Cyclone Idai in March 2019, which displaced over 2.2 million people and destroyed the city of Beira. The potential for a related disaster, such as the bursting of one or more of the major highveld dams, such as the Witbank Dam at eMalahleni, or Loskop Dam, on the major river system, the Olifants, is as likely as not.

Continued in-migration of people from countries north of South Africa to the Mpumalanga industrial centres, driven by climate change impacts, will very likely further complicate all the socio-economic issues being faced locally. Social conflict in South Africa often arises in violent xenophobic 'us versus them' situations, leading to injuries, deaths and property destruction, highlighting insecurities for everyone, and being especially traumatising for children.

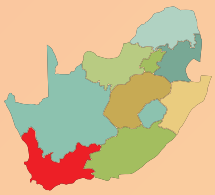
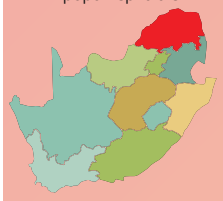
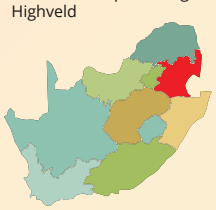
2041-2060:

The dire socio-economic conditions in Mpumalanga will almost certainly be exacerbated by the rapidly advancing coal-death-spiral being brought about by the necessary country-wide transition away from coal to renewable energy, leading to unprecedented job losses through the lack of just transition planning. Without significant and proactive remediation, building on the stress of rising climate impacts impacting daily lives, this will almost certainly cause severe traumatic harms generally, leading to socio-economic disruptions and violence. The collapse of any visible future potential for education, employment and self-advancement for the young adults in the region will cause significant mental trauma.

[8]Coal supply lines have already to date been disrupted by load-shedding and 'wet coal' stockpiles from rainfall

Table 2: Summary of major climate impacts across the three geographic areas.

SUMMARY OF MAJOR CLIMATE IMPACTS ACROSS THE THREE GEOGRAPHIC AREAS

	2021-2040 2°C+	2041-2060 3-4°C	2060-2100 4°C+
 Western Cape and coastal regions	•Marine living resources are rapidly shifting ranges and/or dying out, affecting local livelihoods directly and those of the associated tourism sector e.g. scuba-diving, great white shark and whale watching. •Drought periods are more extensive, affecting the agricultural sector, as well as tourism. • Fire frequency and damageincreases. • Unemployment from economic decline from above impacts rises, together with inmigration from further north. • Significant changes in biotic communities are occurring.	• Earlier impacts increase in frequency and severity. •Coastal flooding and erosion require government imposed 'managed retreats' from a number of shorelines, as increasing frequency of damage to coastal transport infrastructure (roads, railways), and coastal property makes it unaffordable to replace or maintain. • Water resources are severely constrained leading to socio-economic conflict. • Commercial agriculture becomes increasingly unproductive. • Health impacts rise from knock-on effects, rising temperatures, poor sanitation, over-crowding, storm damage, declining service delivery.	• Earlier impacts increase in frequency and severity. • South Africa's coastline is changing fairly dramatically, with coastal towns and cities having had to withdraw inland to higher ground; marine commerce is severely impacted as ports cease to function. • The majority of the Cape Floral Kingdom (fynbos) will no longer exist due to changes in seasonal rainfall and repeated, severe fires. • Property values have plummeted due to ongoing water shortages, coastal erosion and damage, food insecurity, tourism decline and rising social unrest and violence
Limpopo/Lephalale 	• Rising heat stress in both urban and rural settings. • Water resources increasingly are constrained, increasing difficulty to grow rainfed crops and keeping livestock. • Dramatic increases in extreme heat events such as heat waves and high fire-risk events occur. • Reduced access to biological resources e.g.medicinal plants and bushmeat as these are similarly impacted by changing physical conditions.	• Earlier impacts increase in frequency and severity. • Most staple crops, and livestock, are no longer farmable due to drought and heat stress. • Bush encroachment is severely reducing rangeland grazing potential. • Usual coping mechanisms to deal with e.g. multi-year droughts are overwhelmed and people depend on government support and/or voluntary moving as adaptation. • Government services and support are over-stretched and inadequate, forcing mass migration from rural areas to cities. • Social disruption and rising violence is significant.	• Earlier impacts increase in frequency and severity. • Largely uninhabitable area of the country due to heat and drought. • Massive loss of infrastructure to extreme weather events. • Forced out-migration of the population. Only potentially very wealthy individuals and/or industry e.g. mining, able to afford to adapt through extensive cooling and water infrastructure, will be able to be present. • Significant ongoing conflict over allocations of water, including transboundary requirements of neighbouring countries.
Emalahleni/Mpumalanga Highveld 	•Already lethally high air pollution; climate change impacts exacerbate the health and mortality impacts of air pollution. • Rising temperatures make manual labour harder and agriculture less productive. • Already over-subscribed and polluted water resources become sources of conflict. • Extreme storm events damage infrastructure and cause mining stoppages, affecting employment. • Malaria and other diseases become more prevalent and health services are overstretched.	• Earlier impacts increase in frequency and severity. • Phasing out coal mining and power generation without significant transition planning and remediation is causing massive unemployment and social upheaval. • Rain-fed agriculture is no longer viable. • Increasing frequency and severity of tropical cyclones pushing in from the east coast. • Growing infrastructure damage from extreme storm events. • Rising frequency and intensity of fire events razing farms, housing and infrastructure. • Local economies are collapsing due to damage, uncertainties in fossil fuel futures, water problems and rising social conflict over lack of service delivery, unemployment and general social stress, exacerbated by inmigration from countries to the north.	• Earlier impacts increase in frequency and severity. • All coal mining and power stations have closed down, sparking massive social migration to other urban centres. • Water is no longer readily available, even for domestic use. • Commercial agriculture is no longer viable through lack of irrigation water and heat stress • Health problems are rife from food insecurity, poor water quality, spread of infectious diseases and social stress and violence.

Conclusion

Today's youth, and all future generations, are faced with the virtually certain probability of severe harms from a range of increasingly severe impacts caused by climate change. Specifically, increased global average surface temperature brought about by increased GHG emissions through human activities, principally the burning of fossil fuels, will drive these changes. Current food, water, energy, transport and infrastructure systems are extremely vulnerable to the 'business-as-usual' RCP 8.5 emissions trajectory[9] humanity is currently on, which will result in a fundamentally altered physical planet, unsuitable to our current ways of life and largely beyond our ability to adapt.

Every additional GHG emission will exacerbate global heating and the resultant climate change impacts. Projected changes in extremes are larger in frequency and intensity with every additional increment of global heating. Without every effort possible to mitigate emissions, most specifically through cessation of use of fossil fuels, the lives of today's youth and future generations will be profoundly negatively impacted by climate change. Within a decade we will very likely be looking back on today's extreme events as mild. Daily lives will be vastly more difficult, quality of life and economic opportunities greatly diminished and many will suffer premature death from any of extreme weather events, heat-stress, exacerbated diseases outbreaks and/or violent social upheaval and conflicts, as well as stress-induced suicide. Inter-generational inequity will rapidly increase without a transformational change in energy policy now, based on no new fossil fuel investments, and rapid phase out of all existing fossil fuel use.

References

Aucamp I, Retief F; King N (2018) The social dimensions of environmental management. In: King N, Strydom H F Retief (2018) eds. Environmental Management in South Africa. 3rd ed. Juta; Co. 1400pp. Ch23.

Barnwell G 2021. The psychological and mental health consequences of climate change in South Africa. Expert Report commissioned by CER. Available at: https://cer.org.za/reports/the-psychological-mental-health-consequences-of-climate-change-in-south-africa

IPCC 2021. AR6 Climate Change 2021: Working Group 1 - The Physical Science Basis. Available at: https://www.ipcc.ch/report/ar6/wg1/

IPCC 2018. Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels. Available at: https://www.ipcc.ch/sr15/

King N, Strydom H; F Retief (2018) eds. Environmental Management in South Africa. 3rd ed. Juta & Co. 1400pp.

Mallon K 2021. In the matter of Anjali Sharma; ors v Minister for the Environment (Commonwealth) Federal Court of Australia, vid 607/2020. Independent Expert Report.

Scholes B; F Engelbrecht 2021. Climate impacts in southern Africa during the 21st Century. Expert Report commissioned by the CER.

UNEP 2019. UNEP Sixth Global Environmental Outlook (GEO6). UNEP, Nairobi. Available at: https://www.unep.org/resources/global-environment-outlook-6.

[9] SSP5-8.5 (IPCC 2021)

UNEP 2021. UNEP Global Synthesis Report for UNGA: Making Peace with Nature. UNEP, Nairobi. Available at: https://www.unep.org/resources/making-peace-nature

UNICEF 2021a. The climate crisis is a child rights crisis. Available at: https://www.unicef.org/reports/climate-crisis-child-rights-crisis

UNICEF 2021b. The Climate Crisis is a Child Rights Crisis: Introducing the Children's Climate Risk Index.Available at: https://www.unicef.org/reports/climate-crisis-child-rights-crisis

WMO 2021. State of Global Climate Report 2020. Available at: https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate

World Bank. 2016. High and Dry: Climate Change, Water, and the Economy. World Bank, Washington, DC. Available at: http://www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy?CID=WAT_TT_Water_EN_EXT