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South Africa Economic Outlook

Long-term climate risks to the production of essential commodities

Gauging the future impact of drought and heat stress on vital metals, critical minerals, and key crops—and how companies can respond.

26 June 2024

pwc

Ten key messages from this report.

South Africa Economic Outlook June 2024

1

PwC's report 'Climate risks to nine key commodities: Protecting people and prosperity' considered the impact of climate change on commodities that are essential for transport, construction, manufacturing, nutrition and the green transition. The study warns that climate change poses a serious and growing threat to the world's ability to produce essential commodities.

2

PwC's climate and weather scenarios towards 2035 and 2050 indicate that the production of vital metals (iron ore, bauxite and zinc), critical minerals (cobalt, copper and lithium), and key crops (maize, wheat and rice) will increasingly be pressured by drought (through water shortages) and heat stress (impacting labour productivity).

3

Vital metals like iron ore, bauxite and zinc are essential for diverse industrial and manufacturing applications and steel production. Most of the mining for vital metals occurs in surface and open pit operations. Here, heat stress caused by direct sunlight could cause substantial reductions in labour productivity.

4

SA uses vital metals to produce steel, aluminium and other products that underpin the country's industrialisation ambitions. For metal producers, the Taskforce on Climate-related Financial Disclosures (TCFD) frame-work can help assess how climate change impact areas of their business, including the sourcing of commodities and how to respond to these risks.

5

Critical minerals are essential components in technologies that form part of the green energy transition. A lack of water undermines water-intensive mining operations, including ore extraction, mineral processing and dust control. As such, droughts will impact the production of critical minerals like cobalt, copper and lithium.

6

SA will soon need to use a substantial amount of critical minerals to manufacture electric vehicles (EVs) due to legislative changes in major export markets banning the sale of internal combustion engine (ICE) vehicles as soon as 2030. Automotive manufacturers need to work with competitors to secure the supply of critical minerals needed by the industry.

7

Agricultural commodities are at risk of both drought and heat stress going forward. Farming is the world's thirstiest industry and the absence of water for irrigation poses an existential threat. In turn, workers in the agricultural sector are particularly at risk from heat stress, with exposure to high temperatures reducing labour productivity.

8

Grain-dependent products account for 70% of SA's food budget. The prerogative for food producers is to secure the future supply of commo-dities that they need to support the country's food security. They can undertake climate change risk assess-ments at the site, project and supplier levels to understand and manage climate-related risks and opportunities.

9

With a growing weather-related protection gap, insurers need to understand climate risk exposure on both sides of the balance sheet, create innovative new products to turn those risks into opportunities, invest in driving the adoption of existing risk prevention solutions and collaborate with stakeholders to chart a viable path to a more resilient future.

10

Resilience to drought and heat stress means being able to anticipate, manage and recover effectively. PwC is helping clients identify climate-related physical and transition risks to their business and operations. Once climate risks are identified, forward-looking companies plan adaptation measures and work with stakeholders to implement them.

About this document

As climate disruption intensifies, we must understand how it will affect our communities, our economy and our lives. For companies that are dependent on essential commodities, climate change has become a real and present threat. Rising temperatures result in more drought, which curb the supply of water for crop irrigation and agricultural processing as well as mineral ore extraction and processing. And more heat stress makes it harder for people to work outside, leading to lower labour productivity and negative health impacts.

PwC's recently released study 'Climate risks to nine key commodities: Protecting people and prosperity' unpacks the assumptions around our future climate scenarios. It looks at what this means for nine essential commodities grouped into three categories, namely: vital metals (iron ore, bauxite and zinc), critical minerals (cobalt, copper and lithium) and key crops (maize, wheat and rice).

In this edition of the South Africa Economic Outlook, we look at what these commodities are used for and their vulnerability to drought and heat stress. The analysis includes South Africa-specific information for each of the three commodity categories, including how the country uses them in the making of steel, vehicles and food products. To help stimulate discussion on how companies should respond to drought and heat stress risk, each analysis includes an anonymised case study of how companies are responding to these challenges.

Key contents of this report include:

Lastly, we comment on how PwC assists our clients with business resilience decisions, helping them anticipate, manage and recover effectively from disruptions associated with climate change (page 12).

Macroeconomic forecasts (26 June 2024)				
Baseline scenario	**2022**	**2023**	**2024f**	**2025f**
ZAR/USD	16.36	18.45	18.60	19.10
Consumer price inflation (%)	6.9	6.0	5.3	4.8
Repo rate (end-of-period)	7.00	8.25	7.75	7.25
Real GDP growth (%)	1.9	0.6	0.9	1.3
Unemployment rate (%)	32.7	32.1	32.5	32.7
Probability weighted average	**2022**	**2023**	**2024f**	**2025f**
ZAR/USD	16.36	18.45	18.68	19.18
Consumer price inflation (%)	6.9	6.0	5.3	4.9
Repo rate (end-of-period)	7.00	8.25	7.90	7.30
Real GDP growth (%)	1.9	0.6	0.9	1.1
Unemployment rate (%)	32.7	32.1	32.5	32.8

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Climate change is no longer a risk. We are already living it. And the changes to global weather patterns are not just impacting the food we produce, but have a direct impact on our ability to mine the metals and minerals needed for green technologies and products that will shape climate sustainability over the next century. For South Africa, climate change will impact the availability of vital metals, critical minerals and key crops needed to produce the materials and food products essential for economic development and human wellbeing.

Lullu Krugel, PwC South Africa Chief Economist

Protecting people and prosperity: Understanding climate risk scenarios for nine key commodities

South Africa Economic Outlook June 2024

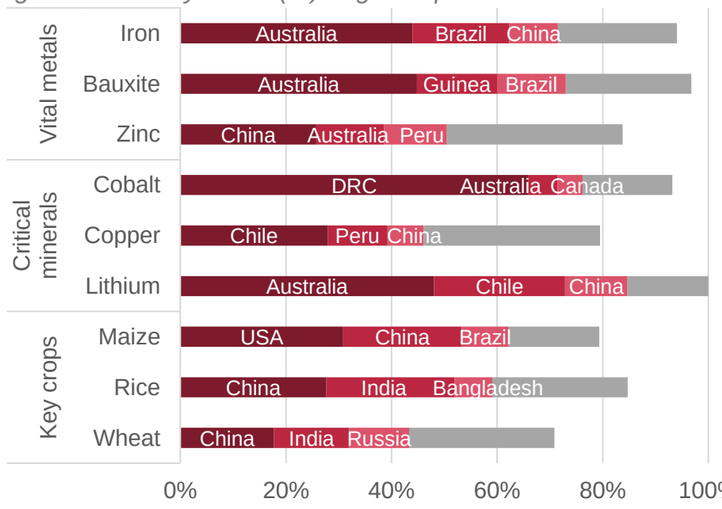
Summary: PwC's weather scenarios suggest that climate change poses a serious threat to the world's ability to produce mine and farm commodities. In particular, drought and heat stress present serious risks to the production of nine essential commodities, grouped into three categories, namely vital metals (iron ore, bauxite and zinc), critical minerals (cobalt, copper and lithium) and key crops (maize, wheat and rice).

Climate change poses a serious and growing threat to the world's ability to produce essential commodities.

PwC's Centre for Nature Positive Business commented last year that 55% of the world's GDP is moderately or highly dependent on nature. On an industry level, the centre's report 'Managing nature risks: From understanding to action' found that 61% of the mining and 87% of the agribusiness supply chains have a moderate or high nature dependence. PwC's recently released report 'Climate risks to nine key commodities: Protecting people and prosperity' looks at the impact of climate change on nine commodities from the mining and agricultural sectors that are essential for transport, construction, manufacturing, nutrition and the green transition. The study warns that climate change poses a serious and growing threat to the world's ability to produce these essential commodities. Even in a best-case scenario in which the world manages to slow the rate of greenhouse gas emissions, climate change will still cause extreme weather conditions to occur with far greater frequency and severity. These conditions, in turn, will cause hardships for the miners and farmers who supply the commodities on which other industries depend.

As illustrated in Figure 1, the global supply of each of the nine key commodities is highly concentrated among just a few countries. For each commodity, at least 40% of its global supply is produced from a distinct set of no more than three countries (highlighted in pink). The concentration is particularly pronounced for lithium, cobalt, iron and bauxite, with more than 70% of global supplies sourced from no more than three countries per commodity. This geographic concentration may heighten the risk of drought and heat stress to the global supply because the more concentrated the sources of a commodity, the greater the impact that disruption in any one locale could have on global supplies.

Figure 1: Country share (%) of global production



Sources: PwC analysis based on data from Capital IQ and Food and Agriculture Organisation (FAO)

Weather scenarios: Mines and farms face increasing water shortages and reduced labour productivity.

PwC identified two climate-related weather perils—drought and heat stress—that are known to be potentially detrimental to production at mines and farms. Heat stress can make it difficult or even life-threatening for workers to work. Droughts, on the other hand, can decimate crops and harm mining production which can be heavily dependent on water. With this in mind, experts at the PwC US climate risk team analysed mines' and farms' future exposure to climate-related drought and heat stress. In mining, a lack of water limits water-intensive operations including ore extraction, mineral processing and dust control. In farming—the world's thirstiest industry, accounting for 70% of the world's freshwater consumption—droughts can reduce crop yields.

Table 1: Drought scenarios

Risk category	Duration of severe drought over a 20 year span
Moderate	10% of time in severe drought
Significant	20% of time in severe drought
High	40% of time in severe drought
Extreme	80% of time in severe drought

Source: PwC analysis of data published in the Journal of Climate

Both mining and farming see productivity declines when heat stress rises, reflecting the fact that miners and farm workers spend a significant amount of time outdoors directly exposed to the impacts of heat and humidity. Even a relatively minor rise in temperature can have a substantial impact on their productivity.

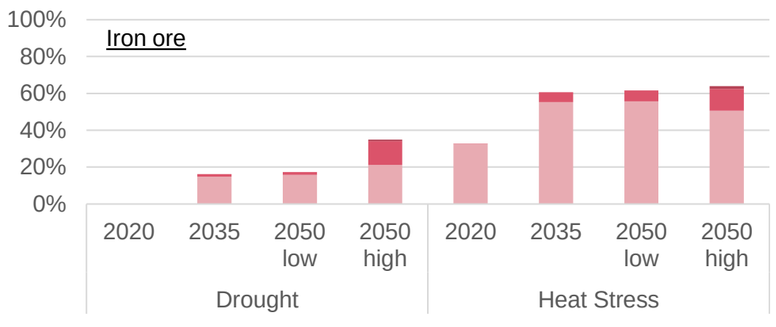
Table 2: Heat stress scenarios

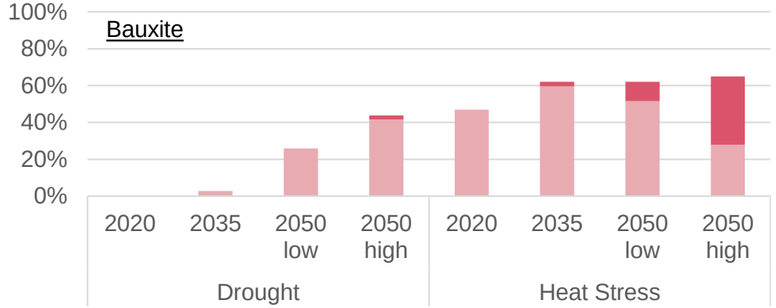
Risk category	Risk levels and duration	Impact on labour productivity
Moderate	At least 10 days above a WBGT threshold of 25.0°C.*	Limited
Significant	At least 10 days per year with an average daily WBGT of 26.3°C.*	Reduces by at least 25%
High	At least 10 days per year with an average daily WBGT of 28.9°C.*	Reduces by at least 50%
Extreme	Each year, an average daily WBGT of 32.2°C occurs on one or more days.	Reduces by at least 75% and is dangerous to outdoor workers

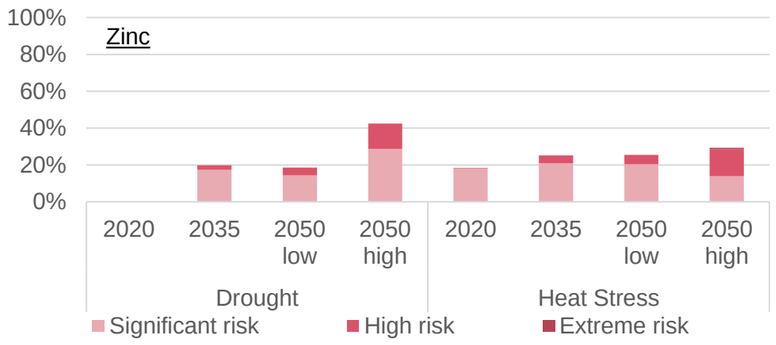
Source: PwC analysis based on data published by the Rockefeller Foundation Resilience Centre
WBGT = Wet Bulb Globe Temperature
**Total days with WBGT at this level may be higher*

Drought and heat stress risks: Their impact on vital metals, critical minerals and key crops

Figure 2: Vital metals drought and heat stress risk

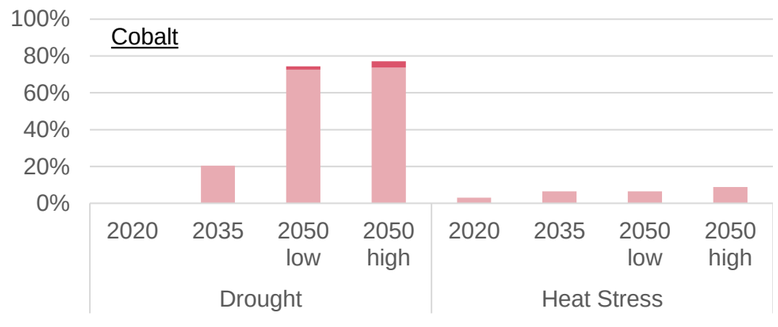


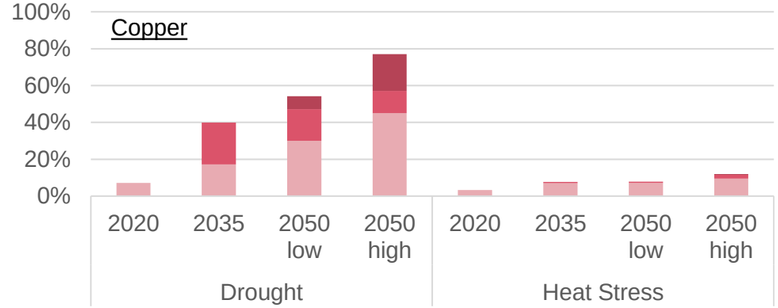


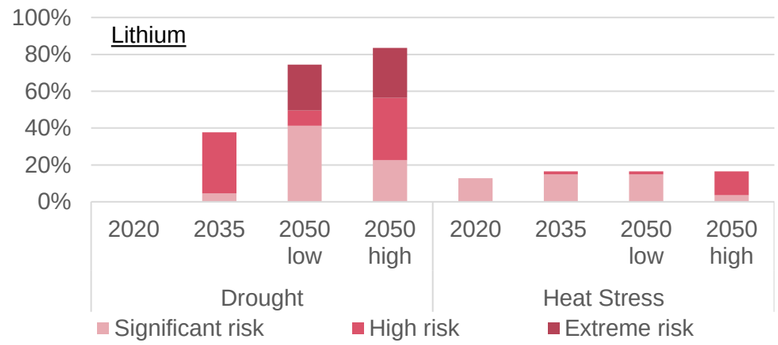


Source: PwC

Figure 3: Critical minerals drought and heat stress risk

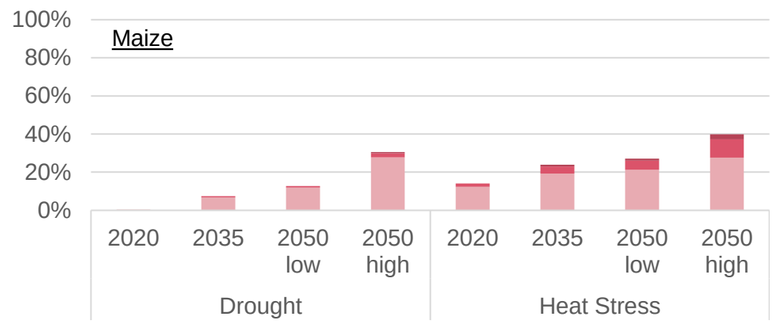


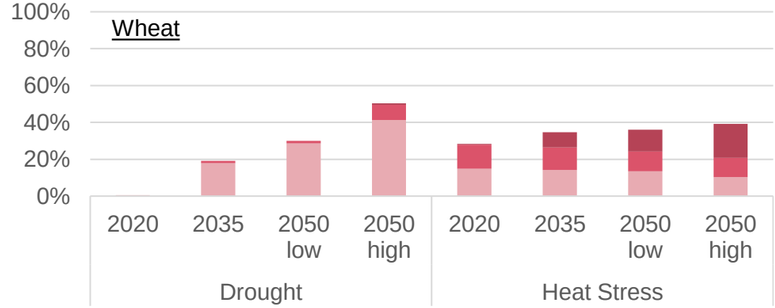


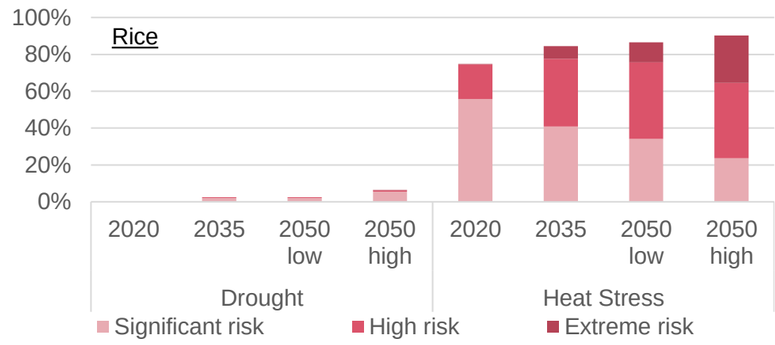


Source: PwC

Figure 4: Key crops drought and heat stress risk







Source: PwC

The remainder of this report looks at what these scenarios mean for the production of vital metals (iron ore, bauxite and zinc), critical minerals (cobalt, copper and lithium) and key crops (maize, wheat and rice) and, in turn, what this means for South Africa. Our analysis includes three case studies of how companies involved in steel production, automotive manufacturing and food production can respond to drought and heat stress challenges to ensure security of input supply. The examples are anonymous but specifically selected to represent South African realities.

Vital metals in steel production: Factories and foundries making metal products are key to industrialisation and localisation

South Africa Economic Outlook June 2024

Summary: Most vital metals are mined in surface and open pit mines where heat stress caused by direct sunlight could cause substantial reductions in labour productivity. SA uses these commodities to produce metals that underpin its industrialisation ambitions. For metal producers, the Taskforce on Climate-related Financial Disclosures (TCFD) framework can assess how climate change could impact areas of their business, including the sourcing of commodities.

Iron ore, bauxite and zinc are key ingredients for making steel and aluminium.

Vital metals are essential for creating construction materials, diverse manufacturing applications and steel production. Demand for these metals is projected to increase due to their role in the production of renewable technologies. Three of the most important vital metals are iron, aluminium and zinc:

- **Iron ore** is the world's most mined mineral and accounts for more than 90% of the volume of minerals mined globally. Given that 98% of iron ore is converted into pig iron for manufacturing steel, this ore is hugely important to the construction industry, which generated over half the world's steel demand due to its unique combination of strength, formability and versatility.
- **Bauxite** is the raw material used to produce aluminium for metal production. Aluminium is used extensively in transportation, construction and packaging, among other industries. In addition, bauxite is a key source of rare metals needed in making green technologies, with bauxite residues also containing trace amounts of rare earth metals.
- **Zinc** is the world's fourth most used mineral. Three-quarters of mined zinc is used to give metals specific properties, such as galvanising steel or iron to prevent them from rusting. Zinc is therefore a key input for construction and automotive manufacturing. It is also widely used in the agricultural, rubber and chemical industries.

Australia, Guinea and Brazil produce about 70% of the world's bauxite, with ten countries accounting for over 97% of production. The same number produces 93% of iron. Australia is the world's largest producer of extracted materials, accounting for 45% of bauxite and 44% of iron ore. It also has 20% of iron ore reserves, the largest share in the world. Lasty, China is the biggest producer of zinc, accounting for about 26% of production and holding 13% of the metal's reserves.

Workers at surface and open pit mines are at risk of heat stress – impacting both their productivity and health.

Most of the mining of our essential commodities takes place in surface and open pit mines, with more than 85% of bauxite and iron ore extracted this way—including major iron ore mines in the Northern Cape. Surface and open pit mines are more likely to be exposed to direct sunlight, leading to a higher Wet Bulb Globe Temperature (WBGT)—a measure that captures both heat and humidity—and accompanying heat stress. **By our estimates, some 61% of iron ore, 62% of bauxite and 25% of zinc mining are at significant, high or extreme risk of heat stress globally by 2035. These mines are likely to see substantial reductions in labour productivity per worker and increased employee costs (e.g. medical leave) unless adaptive measures are used to protect workers.**

South Africa uses these commodities to produce steel, aluminium and other metals used in construction and other applications. In 2023, South Africa produced 4.9 million tonnes of steel, ranking it 32nd on the list of global steel producers. In turn, steel is used to produce a myriad of goods used across many different sectors, including mining equipment, agricultural machinery and automotive products (see page x), among others. With South Africa's industrialisation and localisation drive, more and more metals like steel will be needed to feed the factories and foundries manufacturing metal products. If not locally produced, the metals used in manufacturing this capital equipment are imported—South Africa buys about a quarter of its steel needs from abroad. However, whether sourced locally or abroad, our drought and heat risk forecasts point to a higher cost and constrained supply associated with these metals in the coming years. The prerogative for metal producers is to secure the future supply of the commodities that they need to support the country's construction and infrastructure development objectives. If not, South Africa will not meet its Sustainable Development Goals (SDGs) associated with decent work and economic growth (SDG8), industry, innovation, and infrastructure (SDG 9), and sustainable cities and communities (SDG11).

Case study: A metals producer applies the TCDF framework to understand their exposure to climate change.

A global metals producer applied the Taskforce on Climate-related Financial Disclosures (TCFD) framework to assess how climate change could impact areas of its business, including the sourcing of commodities. Many commodity consumers have used the TCFD framework to analyse their climate-related risks and opportunities. For this metals producer, it involved collecting data on the company's main sites, including production and commodity storage facilities, and then conducting a risk assessment according to different metrics. The data was then used to create hazard dashboards to indicate the level of exposure of these sites to climate-related changes. In addition, the most important activities were mapped and sensitivity profiles were created to decide which activities to focus on. This helps to identify adaptation plans for the business with the use of a vulnerability questionnaire to better understand the context and preparedness of the company. As a result of the assessment, the company understood how its business can be affected by climate risks and its teams were trained to perform further evaluations of more than 80 sites worldwide. These results can be integrated with risk management to assist in quantifying the most material physical and transition risks to enhance public disclosure.

Critical minerals in automotive manufacturing: Making EVs will require a significant increase in local battery production

South Africa Economic Outlook June 2024

Summary: A lack of water limits water-intensive mining operations, including ore extraction and processing. As such, droughts will impact the production of minerals like cobalt, copper and lithium. SA will soon need to use a significant amount of these metals to produce electric vehicles. Automotive manufacturers need to implement coopetition—where enterprises engage in both collaborative and competitive strategies simultaneously—to secure input supplies like critical minerals.

Cobalt, copper and lithium are crucial commodities for the green energy transition.

Critical minerals are essential components in technologies that form part of the green energy transition. These include EVs and many forms of renewable energy generation and storage. Three of the most important critical minerals are cobalt, copper and lithium:

- **Cobalt** has become an essential input for certain specialist manufacturing due to its distinctive properties. It is used extensively in the manufacturing of high-speed cutting tools, powerful magnets and high-strength alloys for jet engines and gas turbines. Cobalt has also become increasingly central to the green energy transition due to its role in the production of batteries in EVs, computers and cell phones.
- **Copper** is the third most-used mineral on earth. The red metal's high conductivity, low resistance and broad availability are ideal for electrical wiring and circuitry. Applications in electronics account for nearly half of copper's demand. Copper is also fundamental to the production of industrial machinery, vehicles and green technology.
- **Lithium** is a key component for the production of batteries, which represents 65% of the lithium market, propelled by the growing market for EVs, portable electronic devices and energy stores. Lithium is also a substantial input in national defence, medicine and industrial applications.

Ten countries account for over 97% of lithium production and more than 93% of cobalt production. Australia accounts for 48% of lithium production while the Democratic Republic of Congo supplies 66% of cobalt production with 43% of its reserves. Lastly, Chile is a major producer of lithium and copper, accounting for 25% and 28% of global production, respectively.

Lack of water undermines water-intensive ore extraction, mineral processing and dust control.

Drought has already affected mining in South Africa, with the industry having faced a severe drought in 2015–2017, when water scarcity led to mine closures, productivity declines and economic losses. **According to Nino Manus, PwC South Africa Partner in Water Management, a lack of water undermines water-intensive mining operations, including ore extraction, mineral processing and dust control. By our estimates, 20% of cobalt, 40% of copper and 38% of lithium mining are at significant, high or extreme risk of drought globally by 2035.**

South Africa will soon need to use a significant amount of critical minerals like cobalt and lithium to produce EVs for domestic sales and export. The country's automotive manufacturing industry produced around 630,000 vehicles in 2023 with an aim—under the South African Automotive Master-plan (SAAM)—to lift this to 1.4 million vehicles by 2035. In growing domestic production, the industry needs to transition away from its dependence on producing internal combustion engine vehicles due to legislative changes in some European countries and elsewhere banning the sale of such vehicles as soon as 2030. This will require a significant increase in local battery production, likely supplied with critical minerals from elsewhere on the continent. If not locally produced, these components are (most likely) imported. However, whether sourced locally or abroad, drought and heat stress risk forecasts point to a higher cost and constrained supply associated with these metals in the coming years. The prerogative for automotive manufacturers is to secure the future supply of the commodities that they need to support the country's green energy transition objectives. If not, South Africa will not meet its SDGs associated with industry, innovation, and infrastructure (SDG 9), sustainable cities and communities (SDG11) and climate action (SDG13).

Case study: An automotive manufacturer protecting its supply of critical minerals through coopetition.

A multinational automotive manufacturer relies on regular supplies of lithium and cobalt to produce the batteries for its cars while also purchasing ready-made batteries from suppliers. The company has therefore adopted a multi-pronged strategy to build vertical integration and establish a reliable critical minerals supply chain. To diversify its supply base, the company signed additional agreements with lithium and nickel producers in several countries to grow its supplier base. It is also collaborating with other battery makers to facilitate consistent supply. Furthermore, in addition to its own cell manufacturing operations, the company currently uses cells from four different suppliers with three different battery chemistries.

Globally, carmakers are collaborating with other industry players to secure supplies of materials for their manufacturing processes. They are collaborating on broader climate action with a range of stakeholders, from governments and investors to academics and local communities. Companies are working within these eco-systems to develop new measures that will support their operations for the long term. In so doing, they are protecting both their own strategic interests and the interests of future genera-tions. Coopetition—where enterprises engage in both collabo-rative and competitive strategies simultaneously—is at the core of securing input supplies. Supply chain coopetition can be particularly valuable in complex, global supply chains like those of critical minerals where the challenges of logistics, sustain-ability and innovation are significant. It is a delicate balance, but when done right, supply chain coopetition can be a game-changer for businesses looking to thrive in a risky environment.

Commodity producers and consumers should prepare for growing disruption risk. They need to enhance resilience by identifying and managing climate risks throughout the supply chain. Next, they need to capitalise on the opportunities to deliver products, services or business models that help companies and communities adapt. But doing this alone is not an option: collaboration is key. All stakeholders must join forces to shape collaborative outcomes and enhance adaptation at a policy and systemic level to build real resilience against the impact of droughts and heat risk.

Vuyiswa Khutlang, PwC Southern Africa Mining Assurance Leader

Key crops in food production: Grain-dependent products account for 70% of South Africans' food budget

South Africa Economic Outlook June 2024

Summary: Agricultural commodities are at risk of both drought (through water shortages) and heat stress (impacting labour productivity). Grain-dependent products like cereals, meat and dairy account for 70% of South Africa's food budget and 10% of total household spending. Food and beverage companies can undertake climate change risk assessments at the site, project and supplier levels to better understand and manage climate-related risks and opportunities.

Maize, wheat and rice are the primary source of food for billions of people globally.

Key crops are the cereal commodities most consumed by humans. These soft commodities are the primary source of food for billions of people around the world and are also used for animal feed to produce meat and dairy. Three of the most important crops are maize, wheat and rice, which combined account for 90% of all cereal crops grown in the world:

- **Maize** is the most produced cereal in the world. Some 80% of maize is used to feed humans—in e.g. breakfast cereals, baking products, confectionery and sweeteners—and animals. After wheat rice, maize is the third most consumed cereal by humans. The indirect channel (via animal feed) through which humans consume maize also makes this a key global crop.
- **Wheat** is the third most produced cereal for human consumption. Cultivation of this crop takes up the largest land area globally out of the three listed here. Wheat is also processed into flour which, in turn, is used in the production of bread, pasta, breakfast cereal and confectionery.
- **Rice** is the second most produced cereal in the world and supplies 20% of the world's dietary energy. The crop is the primary source of nutrients for more than three billion people. Rice is consumed directly as a food product and is also used in the production of flour, oil and derived products like pasta.

China and India together produce 25% of the world's maize, 32% of wheat and 52% of the rice. That being said, production of food crops is more dispersed than that of metals and minerals. Countries outside the top 10 produce 22% of the world's maize, wheat and rice. Maize is the world's second most widespread crop, with about a third of the world's farms growing the crop. Production of wheat, on the other hand, is the least concentrated of the essential commodities, with ten countries accounting for 71% of global output. In contrast, global rice production is highly concentrated by region—90% of the world's rice is grown in Asia.

Climate change exposes farm workers to heat stress and reduces labour productivity.

According to Andrew Dale, PwC Africa Agribusiness Leader, global agriculture is at risk of both heat stress and drought. Workers in the agricultural sector are particularly at risk from heat stress, and climate change will increasingly expose outdoor workers to heat. By our estimates, some 24% of maize, 35% of wheat and 84% of rice cultivation are at significant, high or extreme risk of heat stress globally by 2035. From a water usage perspective, farming is the globe's thirstiest industry, accounting for 70% of the world's freshwater consumption. In this context, the absence of water (drought) for irrigation poses an existential threat. Water is particularly critical in the cultivation of the three key crops.

South Africa uses these soft commodities to produce food products and to feed animals which, in turn, provide other food products. According to Statistics South Africa, bread and cereals (made from maize, wheat and rice) account for 20% of South Africans' food spending basket. In turn, meat (35%) and dairy (15%) products—produced from animals fed in part with grains—account for 50% of consumer expenditure. Together, these grain-dependent products account for 70% of South Africans' food budget. If not locally farmed, these commodities are imported. However, whether sourced locally or abroad, our drought and heat risk forecasts point to a higher cost and constrained supply associated with these cereals in the coming years. The prerogative for food manufacturers is to secure the future supply of the commodities that they need to support the country's long-term food security. If not, we will not meet our SDGs associated with zero hunger (SDG2), decent work and economic growth (SDG8) and life on land (SDG15).

Case study: A food producer developed a risk-informed climate and business resilience strategy.

A global food and beverage company undertook climate change risk assessments at the site, project and supplier levels. Having identified climate change as a key risk, the company used these assessments to better understand and manage climate-related risks and opportunities. It also used climate scenario analysis to better understand the impact of climate change—temperature rise beyond the 1.5°C target—towards 2040 to analyse impacts of input supply shocks and damage to facilities.

Informed by the climate risk assessment and scenario analysis, the company developed a comprehensive climate strategy outlining efforts to mitigate the physical risks of climate change to its business. From an input supply perspective, the company worked towards sustainable sourcing, including promoting regenerative agriculture in the value chain. It also developed site-specific loss prevention, business continuity and water reduction plans to manage risks to facilities. This climate strategy has been integrated into the company's existing systems and processes, including risk management and executive compensation.

In addition, the company made public commitments towards nutrition, health, wellness, and water and environmental sustainability. These commitments are intended to achieve three ambitions for 2030, namely enabling healthier and happier lives for individuals and families; helping to develop thriving, resilient communities; and stewarding resources for future generations.

Climate risk in insurance: Risk carriers need to turn climate risks into opportunities

South Africa Economic Outlook June 2024

Summary: Insurers need to focus on the causes of losses, enabling prevention, and greater resilience. To do so effectively, they need to understand climate risk exposure on both sides of the balance sheet, create innovative products to turn these risks into opportunities, invest in driving the adoption of existing risk prevention solutions and collaborate with stakeholders to chart a viable path to a more resilient future.

SARB stress tests show reinsurance helps non-life insurers limit climate-related losses.

This month, the South African Reserve Bank (SARB) published its latest Financial Stability Report (FSR) where it considers the state and stability of the country's financial system. The latest edition of this report included an Insurance Common Scenario Stress Test which subjected a set of potentially systemic South African insurance companies to a selection of shocks and scenarios, including declines in equity prices, large swings in debt yield rates, a large lapse in premium payments and increases in mortality. The evaluation found that the selected insurance firms are adequately capitalised to withstand the shocks and scenarios considered.

In addition to the regular shocks and scenarios, the central bank introduced a climate change add-on under which the non-life insurers were required to assess their vulnerability to drought and flood scenarios. The results highlight a muted impact from climate risk for the insurers. However, this does not reflect the absence of exposure to climate risks. Rather, the FSR notes the positive impact of natural catastrophe reinsurance as a key mitigating factor to the impact of climate change on insurers. At the same time, the FSR warned that "as the frequency and severity of the catastrophic climate change events increase, reinsurers may reduce their appetite for these risks, which poses a critical financial stability risk".

Insurance companies need innovative products to turn climate risks into opportunities.

The fundamental purpose of insurance and reinsurance is to provide protection and transfer risk. However, according to Alsue du Preez, PwC Africa Insurance Leader, this is proving increasingly difficult in a time of more widespread, acute and severe weather events. Climate change—alongside cyber risk and impediments to high and equitable economic growth—is what the SARB calls a 'perpetual' risk. The country has seen an increase in the frequency and impact of extreme weather events which, in turn, have resulted in increasing damage to property and associated losses for insurance companies, banks and other financial institutions that are exposed to these assets. The SARB notes that these events have been prominent in the country's insurance claims statistics for the 2022-2023 period. Increased claims have also resulted in heightened reinsurance premiums.

Table 3: Major weather events (2023)

Most frequently occurring weather events	Most vulnerable geographies	Month of highest event risk
1. Heavy rains/flooding	1. Eastern Cape	1. June
2. Severe thunderstorms	2. Western Cape	2. July
3. Cold-related events	3. Free state	3. September

Source: PwC analysis of South African Weather Services (SAWS) data

The increasing frequency and severity of weather events is putting insurers under strain, and compensating clients for increasingly costly damage to property and health is in some cases becoming unviable. Globally, some insurers have responded to severe climate risks by no longer covering them. To close a growing protection gap without significantly increasing the cost of insurance, carriers need to focus on the causes of losses, enabling prevention and greater resilience. Addressing climate risk is a huge challenge, but we believe the industry can adapt to meet it. To do so effectively, insurers will need to:

- **Understand climate risk exposure on both sides of the balance sheet**: On the asset side, the investment portfolios of insurance companies can be vulnerable to the financial impacts of climate change. This includes holdings in sectors that are subject to policy, legal and market shifts as global climate policies evolve. On the liability side, insurers face risks related to the policies they underwrite, especially in areas like property insurance. The increasing frequency and severity of climate-related disasters have resulted in higher claims and payouts, as noted by the SARB FSR.
- **Create innovative new products to turn those risks into opportunities**: As climate change leads to new types of risks, insurers can design coverage that specifically addresses these threats. This could involve policies for businesses that are particularly vulnerable to climate impacts. This year, South Africa's Prudential Authority approved index-based crop insurance for farmers. Also known as parametric insurance, this coverage pays out when certain production-associated metrics like soil moisture or rainfall move below a predetermined threshold.
- **Invest in driving adoption of existing risk prevention solutions**: Many solutions to combat climate disasters already exist. These include coastal structures that buffer waves and reduce surge flooding. How-ever, widespread adoption in at-risk areas is slow due to compounding factors of awareness and affordability—often on the part of the public sector. To drive adoption, invest-ment by insurers and impacted constituents (builders, financers and government) would provide long-term benefits.
- **Collaborate with stakeholders to chart a viable path to a more resilient future**: No single constituency can build climate resilience on its own. Accordingly, collaboration among many different stakeholders is needed to encourage wider effort and adoption. This includes active and ongoing interaction by insurers with policymakers, regulators, other industries, customers and other stakeholders. Insurers can share their risk expertise and collaborate with a broad set of stakeholders to jointly invest in building a more resilient path forward for the industry and society as a whole.

Economics services and contacts.

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How we can help.

Forward-looking companies have begun safeguarding their operations and supply lines against the climate-related disruptions explored on the preceding pages. PwC's 27th Annual Global CEO Survey found that two out of three of South African CEOs are working on initiatives to protect their company's physical assets and/or workforce from the impacts of climate risk. Many are also exploring business opportunities and working across sectors to shape better outcomes. While a climate-stressed future will not be easy for businesses, companies that get ready now can improve their chances of coming out ahead in challenging conditions. Businesses that commit and collaborate can boost their chances of positive outcomes and gain advantages in the market.

Resilience to drought and heat stress means being able to anticipate, manage and recover effectively. PwC assists clients in taking a structured approach to building resilience. To begin, we help these companies identify risks relevant to their business and operations, including risks in supply chains. These may extend beyond immediate climate threats to include impacts such as new regulations or changes in market prices. Once climate risks are identified, forward-looking companies plan adaptation measures and work with others to implement them. They also look for technology solutions to support production at scale and prepare for rising risk exposures. These steps are part of an overall sustainability strategy which, in turn, forms part of a company's overall strategic planning.

Our services

The PwC South Africa Strategy& Economics team is a specialised unit of economists who serve our clients in a variety of ways. Our services include:

Measure your impact on the economy and society

- Economic Impact Assessment (EIA)
- Socio-Economic Impact Assessment (SEIA)
- Regulatory Impact Analysis (RIA)
- Environmental, Social and Governance (ESG)
- Total tax contribution
- Localisation calculations

Make decisions about risk and investment

- Macroeconomic research
- Market entry analysis
- Country and industry risk assessments
- Commercial due diligence assistance

Plan for future economic scenarios

- ESG scenario planning
- Economic and political scenario planning
- Industry and macroeconomic modelling
- IFRS 9 audit assist

Please visit our website to learn more: https://www.strategyand.pwc.com/a1/en/solutions/purpose-led-economics.html

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