

CLIMATE-RELATED RISKS, OPPORTUNITIES AND DISCLOSURES

Quantum Foods is exposed to changing weather patterns, droughts, and floods, which affect the agriculture industry and our primary inputs and operations. We make a conscious effort to manage and minimise our environmental impact and support the effective consumption of resources, focusing on water and energy.

Governance

How does the board provide oversight of climate-related risks and opportunities?

Quantum Foods applies the principles of King IV, in terms of which the Board *inter alia* takes responsibility for ethical leadership, which includes anticipating, preventing or ameliorating any adverse consequences of our operations on the environment and other stakeholders. This includes considering climate-related risks and opportunities.

Board • Responsible for oversight of ESG, including climate-related risks and opportunities • Commissioned the annual independent ESG review incorporating climate-related risks and opportunities • Included ESG performance targets in remuneration policy • Considers climate-related risks and opportunities when making capital allocation decisions	Remuneration in focus: Operational targets relate to efficiency, ESG and cost management. As such, these targets can only be achieved if climate-related risks and opportunities are actively managed towards positive outcomes. ESG targets are commercially sensitive but drive improvements identified by the independent ESG review. 📄 Read more on page 76.
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SETC • Provides oversight of Quantum Food’s performance in terms of the environment as per the Companies Act requirements • Mandated by the Board to monitor and report on climate and environmental issues • Responsible for implementation of the sustainability policy that incorporates the responsible investment code, and serves as a guideline for integrating ESG into everyday practices • Reports directly to shareholders on matters within its mandate	Capital expenditure in focus: The investment in the Malmesbury feed mill considered energy and safety improvements that mitigate potential climate risks. 📄 Read more on page 58.

What is management’s role in assessing and managing climate-related risks and opportunities?

Management implements the sustainability policy, which has set environmental objectives:

- To minimise adverse impacts and enhance positive effects on the environment, as relevant and appropriate
- To make efficient and sustainable use of natural resources, such as soil, land, livestock, biodiversity and water, and to take a preventive and precautionary approach to protect the environment wherever possible
- To support the reduction of greenhouse gas emissions, which contribute to climate change
- To encourage the development of environmentally friendly technologies

We assess environmental impacts by:

- Identifying potential risks and appropriate mitigating measures through an environmental impact assessment, specifically when business operations change
- Considering the potential for positive environmental impacts from business activities
- Taking appropriate actions to mitigate environmental risks
- Considering the impact of operations on the environment, particularly in terms of carbon emissions, is an important consideration when evaluating new capital projects

Climate risk assessment process

The Quantum Foods executive management team initiated a climate risk assessment process in 2024, focusing on four operational sites in the Western Cape. They provided guidance in terms of process, approach and potential challenges, including the need to raise internal awareness about climate change. Management teams at the sites participated in facilitated working sessions with a climate expert around the physical and transitional risks that can impact their operations. They also identified existing and potential mitigation and adaptation measures. The process was used as input into the ERM and strategy development processes.

Management responsibilities in terms of climate risks and opportunities include:

- Ensuring compliance with applicable local and national environmental laws and swiftly addressing any identified gaps. This includes keeping track of climate-related legislative and regulatory changes and requirements
- Including climate-related data in monthly management reports submitted to the executive committee
- Using operational certifications and audit processes to drive resource and process improvements
- Using resource data to identify opportunities to reduce impact and improve the Group’s resilience to climate change while managing costs

Strategy

What climate-related risks and opportunities have we identified over the short, medium and long-term?

Climate and materiality	Quantum Foods’ annual reporting process includes a review of the Group’s material impacts, including on the environment. The material impacts highlight aspects important to our stakeholders and complement our strategic risks. Two material impacts are directly linked to climate-related risks and opportunities: • Protecting the environment (emissions and waste) • Water ➦ Read more about these material impacts on page 95.
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Climate risks and opportunities included in this report have not yet been filtered for short, medium or long-term impacts, and no financial outcomes were calculated. Further research is also required to better understand the link between climate events and HPAI outbreaks, as well as mycotoxin prevalence and crop nutrition.

Physical risks

Acute, event-driven risks

Extreme weather events

Extreme weather events can lead to crop destruction in raw material source countries, affecting availability, quality and price volatility. Extreme weather events can also cause rapid increases or decreases in demand for animal feed.

Mitigation and adaptation measures in place include:

- We have a diverse and global raw material supply network. Due to supply constraints related to weather events, we might incur increased transport costs. A diversified network, however, limits our ability to build long-term relationships with local farmers through which we could help improve soil quality, secure offtake agreements, be climate resilient, etc
- We contract with international commodity trading companies that carry the majority of supply-related risks
- Quantum Foods evaluates key raw material sourcing countries like Argentina to obtain direct input on changing weather patterns and the impact on future crop availability, quality and pricing
- We regularly test the quality and nutrient value of raw materials. This enables us to change animal feed formulas and use substitute materials without affecting nutritional value

If birds are under stress due to weather events, performance and egg quality can be affected, which in turn affects farming efficiencies and earnings. Extreme temperatures also affect best-before dates of eggs, leading to additional temperature control requirements and increasing energy requirements.

Mitigation and adaptation measures in place for the egg business include:

- We adhere to the FSSC version 5.1. food safety certification
- We have tracking systems that can identify any affected batches of eggs and source farms
- We use the Lohmann standard to assess the quality of eggs and measure this against industry standards
- We also assess the Haugh value to check yolk strength, shell thickness, weight, etc

Infrastructure damage and unavailability due to storms, floods and fires

Infrastructure damage and unavailability can lead to an inability to transport products, damage to trucks and supply chain inefficiencies while potentially affecting product quality. Increased weather-related damage is driving higher maintenance and insurance costs.

Mitigation and adaptation measures in place include:

- A comprehensive insurance programme incorporating damage to assets and business interruption
- We track mud recovery costs that result from poor and damaged road infrastructure due to weather events. This enables us to effectively engage with farm owners to improve infrastructure and reduce the cost of servicing them. [Read more about mud recovery cost on page 46](#)

Chronic risks

Climate-related HPAI outbreaks

Changing temperature and rainfall patterns affect wild bird migratory patterns that can be linked to HPAI outbreaks. These outbreaks can lead to the closure of operations and sudden drops in supply, affecting volumes, margins, and profitability and causing retrenchments and negative market responses. Stricter regulatory measures related to HPAI might increase Quantum Foods' operating costs.

Mitigation and adaptation measures in place include:

- Quantum Foods has strong biosecurity measures at all relevant sites
- Enclosed layer and broiler housing limits exposure to disease-carrying wild birds and animals
- Tree removal around chicken houses discourages wild bird nesting

Increasing temperatures

Increasing temperatures can cause animals to eat less, impacting feed formulation, operational efficiency, margins, and customer satisfaction. Broilers must be kept within a narrow temperature band to achieve modern breeds' high genetic potential. Temperatures above 37°C can cause heat stress for birds, resulting in reduced productivity and fatalities.

Mitigation and adaptation measures in place include:

- Newer generation hen houses require less temperature control and have ventilation and cooling fans to optimise performance

Temperature increases can affect eggs' shelf life and quality, resulting in smaller sizes, thinner shells and variable yolk colouring. This can impact selling prices and increase stock returns.

Mitigation and adaptation measures in place include:

- We monitor and record temperatures in the egg packing stations, where air conditioning is compartmentalised to target specific activities. High-risk storage areas are equipped for consistent temperatures. We adjust best-before dates based on temperature as this impacts the quality of eggs, thus limiting the number of returns while protecting margins and reducing waste

Higher temperatures, shifts in rainfall patterns and atmospheric carbon dioxide can affect the quality of protein in feed raw material which might affect performance and lead to financial losses¹.

Mitigation and adaptation measures in place include:

- We use substitutes and additives, which result in increased feed costs

Ambient temperature fluctuations

Low ambient temperatures increase poultry feed consumption without a comparable performance increase. Higher temperatures can result in lower feed intake and lower performance. Maintaining the range of ambient temperatures requires more cooling and ventilation, resulting in higher energy use. Customers prefer lower-weight broilers with high levels of weight uniformity, emphasising temperature management. Lower-weight birds are more vulnerable to temperature changes.

Mitigation and adaptation measures in place include:

- Most broiler houses and some layer houses are fully enclosed, thus providing better control over the internal environment and optimising temperature, humidity, and ventilation
- We use technology-controlled equipment with an alarm that indicates temperature movements outside the ideal range or electricity supply interruptions
- We use wet pad evaporative cooling systems that reduce the need for air conditioning
- We use birds of the world-leading Ross 308 and Lohmann genetics. Ross 308 birds in particular are known for adaptability to different environments, making the breed suitable for various climates

Increasing drought conditions

Increasing drought conditions can lead to water supply risks, affecting operations and feed quality. The Western Cape is known to be a water-scarce area, with water likely to become scarcer as climate change worsens and the population increases.

Mitigation and adaptation measures in place include:

- Some sites have water treatment plants
- We use recycled water at some sites and provide water to be stored on-site in case of fire and for emergency water supply
- In some cases, we can buy water from neighbouring boreholes to mitigate water supply risk through existing pipelines
- Some farms are supplied by on-site dams fed by mountain streams or municipal sources

¹ Harvard, 2017 – <https://www.hsph.harvard.edu/news/press-releases/climate-change-carbon-emissions-protein-deficiency/>, Harvard, 2018. <https://www.hsph.harvard.edu/news/press-releases/climate-change-less-nutritious-food/>, Nature, 2016. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4810679/>, Environmental Health Perspectives, 2017. <https://ehp.niehs.nih.gov/doi/10.1289/EHP41>

Climate-related mycotoxin risk

Increased temperatures can stimulate the growth of mycotoxin-producing fungi¹, which can contaminate and affect the quality of raw materials. Excessive rainfall during growing seasons promotes fungal growth, while drought conditions may lead to mycotoxin production in stressed plants. Mycotoxins cause metabolic disorders and weak productivity in animals. Storage will also become more challenging as pathogen growth erodes feed quality. This may result in an increased requirement for mycotoxin binders in the feed, increasing the cost per ton.

Mitigation and adaptation measures in place include:

- We conduct laboratory tests for mycotoxins at the feed mill
- We test Poultry for mycotoxin prevalence

Emissions affecting our carbon footprint

Quantum Foods' reliance on coal-fired energy and fuel-driven generators contributes to our carbon footprint and can lead to a significant carbon tax burden and reputational risk.

Mitigation and adaptation measures in place include:

- Some facilities have solar installations providing sources of renewable energy
- We feed excess energy supply back into the grid at one site. We have a service level agreement with a company that services the panels and guarantees effectiveness over 20 years

Transport emissions result from increased road transport and backup generator use, which increases our carbon footprint, thus contributing to climate risk. This is often due to an increased requirement for birds and eggs to be transported between regions due to HPAI outbreaks and market demands.

Mitigation and adaptation measures in place include:

- We reduce costs and diesel emissions by optimising route planning and the use of generators
- Temperature-controlled trucks, which are more fuel-intensive and thus result in higher emissions, are only used for day-old-chick and liquid egg transport

Waste contributes to emissions

Waste from operations can contribute to higher emissions, which can lead to climate change. Waste is directly linked to bird and egg volumes, and HPAI outbreaks (mortalities). Through the Extended Producer Responsibility Act, Quantum Foods, as a brand owner, is also responsible for safely disposing of packaging.

Mitigation and adaptation measures in place include:

- Wastewater is captured and channelled into evaporation ponds at many sites
- Manure and droppings are sold to an organic fertilizer company that produces compost and pellets for the agricultural sector
- Eggs that do not meet retail specifications and those returned from retailers are sold as liquid eggs, mainly to the hospitality industry
- Strictly managing egg losses against targets. Presently, less than 0.60% of eggs are lost in the process
- Egg packing station waste, such as egg shells and some liquid, is composted through a Biobin® system
- We use biodegradable egg packaging

¹ Toxins (Basel), 2022 – <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9319892/>, Food Research Journal International, 2010. <https://www.sciencedirect.com/science/article/abs/pii/S0963996909002130>, Plant Pathology, 2011. <https://bsppjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3059.2010.02412.x>.

Transition risks

Policy and legal	Increased regulatory requirements regarding health, safety, waste and environmental standards are expected and will incur additional operational costs. Policy changes are likely to demand more focus on monitoring environmental data and implementing actions to reduce the environmental impact of the business. New environmental legislation that protects carbon stores such as forests and increases global demand for paper products might increase our packaging costs. Input costs related to water are expected to increase based on increased demand and increasingly limited supply, which climate events will exacerbate. Read more about new water pricing regulations on page 95. Input costs related to energy are expected to increase due to higher investment costs for alternative, renewable energy sources to reduce emissions in line with South African national commitments to net zero and implementing a more punitive carbon tax regime. Read more about the new Climate Act on page 38. Inconsistent and rapidly changing regulations between different countries from where we import raw materials can result in supply disruptions, for example, due to the use of genetically modified maize. Our Fynbos broiler farm is part of the Atlantic Sand Fynbos conservation site, which has been under Cape Nature's stewardship since 2010. As a result, we are subject to more stringent environmental regulations, which are likely to increase to protect biodiversity in the area. Delayed approvals of the HPAI vaccine and the high cost of vaccination might hinder Quantum Foods' ability to protect its biological assets. Mitigation and adaptation measures in place include: • We contract with a service provider to send regular legal notices to inform us of changes in national, provincial and local legal requirements and regulations, which we address through our risk and opportunity register and compliance programme • Read more about proactive environmental mitigation measures in the section on responsible business from page 74
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Technology	Competitors investing in plants with new technology might be able to offer customers more targeted feed products with more robust conversion results. New technology could offer efficiencies that reduce input costs related to water and energy, and can reduce emissions and dust. Mitigation and adaptation measures in place include: •  Read more about our use of technology and smart farming on page 45
Market	Animal feed customers are increasingly aware of potential methane emission reduction opportunities and the need for alternatives to forage/pasture supply, which is changing due to drier weather. Retail customers' packaging requirements might change to support their climate or net zero commitments. A transition to low-cost and plant-based protein can reduce the demand for eggs. Consumers may also transition to more affordable proteins such as eggs and chicken, leading to higher demand for poultry products. Mitigation and adaptation measures in place include: • Operational flexibility enables us to accommodate shifts in species feed demand should customers change their models based on changing weather patterns • We change feed formulas in response to weather events and apply flexible feed formulas to support environment-related outcomes • Our technical advisers collect data related to climate risks, which they can use to increase awareness, mitigate risk and improve performance
Reputation	There is a risk of negative public perception and civil society activism if fossil-fuel energy use at Quantum Foods increases due to, for example, additional temperature control needs. The carbon footprint of intensive poultry farming is lower than free-range farming due to the lower use of natural resources per dozen eggs produced or per kilogram of broiler meat produced.

Opportunities

- Further solar investment will have three-way benefits: security of energy, reduced cost and reduced emissions
- Vaccination will reduce the risk of climate-related HPAI outbreaks. Quantum Foods can continue lobbying government, through industry associations to enable vaccination in South Africa
- Geographic diversification through farm relocations, new leases or contract farmers will enable Quantum Foods to spread climate-related risks better while targeting less poultry-dense areas without compromising proximity to feed suppliers and customers
- Improved disaster contingency and adaptation plans will create better operational resilience
- With advancing genetics, we expect to continue seeing an improvement in feed conversion, producing less manure per bird
- Precision farming and new technology will play a role in off-site auditing, surveillance and monitoring to improve welfare, performance and efficiency
- Waste can become a source of energy for heating
- Investment in alternative water sources will help the Group manage situations such as infrastructure damage

What was the impact of climate-related risks and opportunities on our businesses, strategy and financial planning?

- Climate-related risks and opportunities might become a significant determinant in future acquisitions, including types of operations and location of facilities. Climate-related risks will also inform future decisions to close or relocate operations
- Access to capital is likely to become subject to climate-related information, and financing institutions are starting to introduce requirements into debt covenants
- As we increase our investment in solar energy, we expect a more reliable supply, lower cost over the long-term and lower carbon emissions

Describe the resilience of the organisation’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Our 2024 climate risk process was based on identifying physical and transition risks and opportunities likely to occur by 2039 at four of our larger operational sites. All four sites were based in the Western Cape and were selected based on their operational diversity.

Animal feed mill	Broiler farm	Layer farm	Egg packing station
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We based the discussions at the sites on a scenario where current international policies and commitments are met, as presented by signatories to the 2015 Paris Agreement through their most recent Nationally Determined Contributions. Meeting these Nationally Determined Contributions will lead to an indicative increase in average global temperatures of 2.7°C by 2100.

The chosen “current policies” scenario will result in “limited” near-term climate change impacts, including:

- Annual average temperature increases of 1°C during this time period are anticipated using the World Bank’s Climate Knowledge Portal ensemble climate model
- The number of very hot days (being above 35°C) is expected to increase by one day a month on average
- Average annual rainfall is expected to decrease by up to 10% over this time period¹

We plan to consider alternative scenarios in the future and will start quantifying financial impacts for the most material risks and opportunities in future reporting periods.

¹ World Bank’s Climate Knowledge Portal ensemble climate model, 2021.

Risks and opportunities

What is our process for identifying, assessing and managing climate-related risks?

We describe our risk management process on page 50. The findings from our climate risk process were integrated into our risk management process. At this stage, we classify risks according to likelihood and impact, which is an executive judgment and not based on scientific data. Our strategic risks on page 51 are the outcome of our risk management process. Four of the strategic risks are directly or indirectly related to the impacts of climate change.

Metrics and targets

What metrics do we use to assess climate-related risks and opportunities in line with our strategy and risk management process?

We measure GHGs for reporting to South Africa’s Department of Forestry, Fisheries and the Environment (“DFFE”), which includes Scope 1 emissions from our South African operations. Our other African operations are now also reporting internally on environmental performance indicators and carbon emissions. No targets have yet been set for climate-related metrics.

What are our Scope 1 and Scope 2 GHG emissions, and related risks?

	2024	2023	2022	2021
Scope 1 (direct GHG emissions) (tCO ₂ e)	21 310	27 122	20 309	17 784
Scope 2 (indirect GHG emissions) (tCO ₂ e)	40 040	39 764	47 922	49 622

* 2024 data includes Scope 1 emissions of 1 676 (2023: 1 369) tCO₂e of our other African operations. No emissions from the other African operations are included in Scope 2 emissions, and comparative figures are presented.

Scope 1 emissions decreased due to decreased coal, diesel and petrol consumption.

 Read more on page 91.

Scope 2 emissions increased due to improved electricity availability from the second quarter of FY24. Scope 2 emissions were calculated using the electricity grid emission factor for South Africa of 1.01 kg CO₂e/kWh, Government Gazette No 50071 (2024) (2023: 1.06 kg CO₂e/kWh, Eskom (2021)).

Quantum Foods paid R864 729 in carbon tax (FY2023: R830 255) relating to the emissions generated in the 2023 calendar year.

The carbon tax rate per ton of carbon emissions equivalent increased by 19.5% in 2024 (2023: 10.4%).

A general rebate of 60% of the carbon tax is included in the R864 729, payable for all fuel types except diesel and petrol. Diesel and petrol attract a rebate of 100% for carbon tax since it is effectively taxed through the fuel levy. Emissions from poultry manure management also attract a rebate of 100%.

Due to participation in the Voluntary Carbon Budget Project, Quantum Foods is allowed a carbon budget rebate of 5%, effective until the carbon budget process becomes mandatory. We are further entitled to a 7.4% trade allowance rebate on all emissions from the animal feed business segment.