

Quorn Foods: Sustainable Food for People and the Planet



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Information used in this case study are based on company disclosures of Quorn Foods and its parent company Monde Nissin Corporation and supplemented by (email interview) with Quorn Foods' Sustainability Development Manager (Ms. Tess Kelly) and additional publicly available information referenced in the Sources section.

About Quorn

Marlow Foods Ltd. (or “Quorn”) is one of the largest meat-alternative companies in the world. It operates under the trading name “Quorn Foods” and is headquartered in the United Kingdom (“UK”). It is a privately held corporation, wholly owned by Monde Nissin Corporation. Quorn products were first sold commercially in 1985 and has since grown to a profitable enterprise with US\$300 million in sales and US\$45 million in EBITDA as of 2020.¹ All manufacturing activities are done in the UK, but its products are sold globally through modern retail and food service. It has over 940 employees to date. Quorn uses mycoprotein as its main ingredient and has successfully developed proprietary technology to manufacture a variety of meat-free analogs such as nuggets, sausages, fillets, fish-less fingers, burgers, and mince that are suitable for all meal occasions.^{2,3}

I. Defining Sustainability: Getting to Net Positive

Quorn’s purpose is to provide healthy and sustainable food for the growing population while minimizing harm to the environment. The company has an aspiration to be a “net positive” enterprise by 2030. Quorn defines “net positive” as putting back more resources into the world than it utilizes. It aims to leverage its business to provide sustainable and nutritious food solutions, have a positive social impact, and protect natural resources by tackling both environmental and non-environmental factors. In considering its strategy, the company takes a holistic approach across environmental, social, and economic factors in line with its view that it is not possible to isolate the health of the business, the customers they serve, and the planet, rather these are inter-related and should be tackled in a cohesive manner.

During a lecture at the Institute of Food Science and Technology (IFST), Quorn’s Head of External Engagement, Tess Kelly, described the reason sustainability is integrated into their business: “Where we’ve come to as a business is the fact that we can’t separate these two issues (business and sustainability). If we don’t focus on climate change and climate issues as well as population health, then at some point one will affect the other negatively and we have to take this into consideration at the same time.”⁴

With this principle in mind, the company’s sustainability objectives are encompassing and well-integrated throughout its products, processes, organization, supply chain, customers, and stakeholders. These include enhancement of efforts to transition to a low-carbon business which include use of renewable energy, increase efficiencies in its supply chain and distribution networks, engage in responsible sourcing of materials, reduction of fuel-intensity, and use of less land and water for production. Quorn also incorporates non-environmental factors in its key performance indicators including social assistance through education and mentorships, reporting transparency, and employee safety.

Quorn’s technology and products have been developed with sustainability objectives at its core. It was founded on the premise that conventional protein production from animal farming is

unsustainable and ill-equipped to address food security and nutritional needs of the rapidly growing population.

The company believes that its efforts to mitigate climate change needs to be approached from both production and consumer-focused solutions. On the consumer side, it continues to educate the public about nutrition and how Quorn can address nutritional requirements and reduce environmental impacts, while making its products easily accessible, affordable, and delicious. Quorn published its latest Sustainable Development Report in 2019 and provides updates through its company website. It pioneered carbon footprint disclosure for its products by being the first meat alternative company to have third-party verified carbon footprint data included in its labels.⁵ As of 2020, the company has implemented carbon footprint labeling for 60% of its products based on volume.⁶

It is also developing more ambitious but measurable science-based targets to further reduce its energy, water, and packaging intensity. The company refers to the United Nations Sustainable Development Goals (UN SDG) as its high-level framework and has aligned its goals to contribute to six UN SDGs namely (i) Zero Hunger, (ii) Decent Work and Economic Growth, (iii) Responsible Consumption and Production, (iv) Good Health, (v) Climate Action, and (vi) Partnerships for the Goals. The company also uses the B Impact Assessment to measure its progress on goals.

Product: Not all Proteins are Created Equal

Quorn's proprietary mycoprotein-based food technology is reported to have lower ecological footprint and healthier compared to animal meat. Carbon Trust reported that Quorn mycoprotein-based meat alternatives produce only a fraction of greenhouse gas emissions and utilizes much less resources compared to conventional animal meats. As an example, Quorn Mince's carbon, land, and water intensity are only 7%, 11%, and 8%, respectively, of beef's impact, but at the same time creates more protein compared to beef. Quorn also provides more health benefits as it has less calories, less fat, and contains more fiber than conventional animal-based meat and other mainstream animal protein alternatives. Studies also indicate that Quorn mycoprotein stimulates muscle-building faster, increases food satiety, and improves glycemic profiles.⁷ Quorn's products contain all the nine essential amino acids.^{8,9} In a study by mycoprotein.org, Quorn's Protein Digestibility Corrected Amino Acid Score ("PDCAAS") was found to have the highest score, which indicates better protein and amino acid digestibility and absorption, compared to animal meat sources such as beef, chicken, fish, and turkey as well as plant-based food items like pea flour, kidney beans, oats, lentils, peanut, and whole wheat.¹⁰ The World Economic Forum reported that substituting beef consumption with mycoprotein can reduce mortality rate by up to 2.5% globally.¹¹

The company has a strong track record of developing products that are innovative and responsive to evolving consumer preferences, while continuing to uphold its principles of providing great tasting nutritious food while lessening resource intensity. As an example, Quorn is reviewing possibilities of manufacturing mycoprotein using agro-industrial residues such as rice husks and wheat chaff, which can further reduce water usage by 50% and land use by 75%. The company also invests in consumer and bio-technology research to optimize returns from technology investments. It is evaluating plans for a Global Food Application and Innovation Center that aims to deliver future generations of food solutions that are better for people and the planet.¹²

Process: Minimizing Ecological Input for Maximum Protein Output

Quorn products are manufactured through large scale fermentation of a naturally occurring fungi species in soil that is called *fusarium venetatum* (Figure 2). It is fermented with glucose from wheat, which creates a dough-like substance called Quorn mycoprotein (Figure 3). Due to the versatile qualities of the Quorn mycoprotein dough, it is used as the primary ingredient for all Quorn products such as nuggets, mince, burger, fillets, and more. One speck of the *fusarium venetatum* spore can produce 45,000 tons of Quorn mycoprotein¹³, which is equivalent to approximately 400 million quarter-pound beef burgers, but with substantially less resource inputs and emissions.

The company is continuing to invest in shifting its production facilities to renewable energy sources, adopt processes that will reduce water and energy use, reduce emissions associated with production, adopt waste recycling, and deploy product packaging innovations to eliminate non-recyclable materials and single-use plastics. The company encourages responsible sourcing of materials. As an example, Quorn is a member of the Roundtable on Sustainable Palm Oil (“RSPO”).¹⁴ The company aims to progressively enhance its processes to reduce its environmental impact through enhancements to its work system design. These improvements will have positive impact across product quality, productivity, and sustainability through waste and resource-use reduction. These efforts can contribute to positive customer experience, improvements in its trade cycle, and have meaningful financial advantages through cost reduction and value creation.

In line with the UN SDGs, the company is a signatory to the Wrap Courtauld Commitment 2025 and Target Measure Act to reduce food waste in the United Kingdom.

The company believes that it is essential to involve the entire value chain in reaching Net Positive and as such, the company is expanding its efforts to its supply chain by procuring from suppliers who adopt regenerative farming and committing to responsible sourcing of palm oil¹⁵, its customers through “net zero catering solutions”, and stakeholders through next generation educational programs. (T. Kelly, personal communication. 20 December 2021)

Reporting and Disclosure

Quorn is the first global meat-alternative company to have third-party certification of its carbon footprint metrics, which was certified by Carbon Trust. This allowed the company to include carbon footprint labelling on its products and provide consumers with the carbon impact information about their Quorn purchase at point of sale (Figure 1).

The company established emission and manufacturing waste baseline levels in 2012 and has periodically reported progress. In 2018, the Company reduced carbon emissions per ton of product by 33% and water usage by 16% compared to 2012 baseline.¹⁶ In 2020, 90% of its packaging by weight was made from recyclable material. It is in the process of reviewing and setting science-based targets to define the organization's roadmap and enable its transition to a net-positive enterprise.

Societal Impact

Quorn believes that it will be able to help address multiple social issues such as world hunger, food security, health and nutrition, and be able to do so sustainably, by growing its business to allow more consumers to have access to its products.

Quorn's growth trajectory has been supported by the growth of its employee base. Its future growth will entail job opportunities in local communities where they are present. Employees are provided with a range of services and benefits such as occupational health provisions, employee assistance, and continuing education programs. Retention rates are high; 49% of employees have more than 10 years of service. Quorn's partnerships for internship and employment opportunities with educational institutions provide access to a steady talent pipeline, particularly within the science, technology, engineering, and math programs.

II. Leadership by Example

Quorn's sustainability strategy emanates from the top and permeates down and across the organization structure, under the leadership of Mr. Marco Bertacca who was appointed as Quorn's Chief Executive Officer (CEO) in 2020. He was hired externally from Alaska Foods, a large dairy company in Asia. Quorn's leadership team also benefits from strong sponsorship from its parent company, Monde Nissin, which is a top proponent for the transition of the food sector into more sustainable systems. Monde Nissin acquired Quorn in 2015 as a testament to this objective and has since supported opportunities for sustainable food solutions through innovation. Mr. Bertacca is known for his mission-driven approach to business, which is the foundation of his track record and success in the food industry. He is deeply involved in defining and implementing the company's sustainability roadmap and will always reference the Net Positive ambition in internal or external pieces of content and speaking engagements. Sustainability continues to be a major investment area for the company under his leadership.

Mr. Bertacca is supported by the company's senior management team that include (i) Tim Finnigan, Chief Scientific Advisor, (ii) Tim Ingmire, Research and Development Director, and (iii) Tongwen Zhao, Director for People and Planet.

While sustainability management is a shared responsibility amongst the company's leadership team, the people leading the charge are the CEO and Director of People and Planet. In addition, there are leadership team members such as (i) Andrew Edlin, Head of Sustainability and (ii) Tess Kelly, Head of External Engagement. They engage externally on sustainability issues, ranging from climate to nutrition and health and have been the public spokespersons to represent Quorn in events. They are active on social media and high-profile public events to encourage sustainable nutrition and promote transitioning diets towards more alternative meat to mitigate climate change-induced issues including food security. During the recently concluded 2021 United Nations Climate Change Conference (COP26), Mr. Bertacca wrote an open letter to the delegates, criticizing the absence of the meat industry in the agenda despite it being one of the largest sectors causing global warming (Figure 4).

The core Sustainability Team consists of the Director of People and Planet, Head of Sustainability, Head of External Engagement, and Sustainability Analyst. The team's collective background is primarily in the areas of environmental management within the food industry, psychology, communications, food security, corporate social responsibility projects, and carbon footprint analysis.

Ms. Tongwen Zhao was appointed as Director of People and Planet in 2020. In this role, she is responsible for leading cultural integration throughout the company's operations globally. She also oversees the Human Resources and Sustainability functions. Ms. Zhao is a well-known sustainability champion in the food industry and previously worked for The Dairy Farm Group and Unilever in Asia.¹⁷

The Head of Sustainability is Andrew Edlin and he is responsible for driving environmental projects and strategy plus the creation of Quorn's Sustainable Development Report. He also leads the Net Positive leadership team. Before joining the company, Mr. Edlin was the Head of Sustainability for Muller UK & Ireland.

The Head of External Engagement is Ms. Tess Kelly, who works on strategic partnerships and communications as it relates to healthy and sustainable food consumption. (T. Kelly, personal communication. 17 March 2022) Ms. Kelly has broad and deep experience in meat-alternative transition studies and strategic projects in this food category.¹⁸

The Sustainability Analyst is responsible for environmental data handling such as product carbon footprint information.

Since innovation is at the forefront of Quorn's sustainability driven mission, it is important to have the appropriate scientific expertise supporting the enterprise. Quorn sponsors several PhD and post-doctoral projects in centers of excellence across the UK and Europe, which forms part of an ongoing 35-year scientific research agenda led by Dr. Tim Finnigan, Quorn's Chief Scientific Officer. (T. Kelly, personal communication. 17 March 2022) In addition, Mr. Tim Ingmire, is Quorn's Research & Development Director, and together with Dr. Finnigan, their departments are responsible for new product development, enhancing Quorn mycoprotein production, documenting scientific research for its nutritional advantages, and optimizing operational efficiencies such as increasing mycoprotein yield while using less water and glucose. Dr. Finnigan is a well-known food technologist with over 30 years of extensive experience in food innovation and is a holder of numerous food and business technology patents. Mr. Ingmire brings over 30 years of food research and development expertise from global roles held in large food & beverage companies including PepsiCo, Unilever, and Sara Lee.¹⁹

Consumer interface and perception are also important for Quorn's success in achieving its sustainability goals. As such, the marketing, commercial, and business strategy teams need to closely collaborate to ensure effective brand communication. The company's internal commercial and business strategy teams work with an externally engaged advisers and agents for advertising, packaging design, and product positioning. Quorn also selectively supports sports organizations to reinforce the message that Quorn mycoprotein is an efficient muscle builder. It has a long-term partnership with Liverpool Football Club as the club's "Official Sustainable Protein Partner" and as a contributor to the Reds Go Green initiative.²⁰

There are also internal committees in place supporting the sustainability agenda such as the Net Positive leadership team which includes representatives across key functions of the business and the Internal Champions Network which consists of representation from across business functions and global locations. Internal communications and reporting about environmental and social projects and results are done during monthly leadership team meetings and quarterly during global town hall meetings. The company's TV advertising campaign in the UK this year is focused on sustainability and uses the tagline "Helping the Planet one Bite at a Time". (T. Kelly, personal communication, 20 December 2021)

III. Strategy and Metrics: Roadmap to Net Positive

Quorn monitors its progress on UN SDG baseline and priority goal progress using the B Impact tool. (T. Kelly, personal communication, 20 December 2021) The company tracks environmental key performance indicators versus baseline figures established in 2012. The metrics tracked are (i) carbon footprint from factories and products, which has reduced by 33% since 2012, (ii) percentage of recyclable packaging material used for its products, which now stands at 80% of all packaging products used, (iii) water usage per ton, where the company reported a 16%

decrease in 2019 compared to 2012. Quorn has recently refreshed its sustainability objectives and have set timelines for each milestone. It aims to achieve net zero emissions for its own operations by 2030 and net zero emissions throughout its supply chain by 2050.²¹ More specific Net Positive indicators and baselines are being updated and will be finalized in the coming months.

The company also monitors and reports nutrition and resource intensity metrics of their products and illustrates these through comparative measures versus conventional meats. For example, the company's website describes that the "Quorn Spaghetti Bolognese has 90% less saturated fat than a beef version", "The carbon footprint of Quorn's mycoprotein is 30 times lower than beef", and "The land use requirement of Quorn's mycoprotein is 20 times lower than beef and 4 times lower than chicken."²²

Having time-bound measurable targets is important to enable management to track the organization's progress towards the company's goals, course-correct and fill any gaps, and optimize resources effectively. Successful sustainability-oriented programs include engagements that are aligned to the company's mission. Increased adoption of meat alternatives by consumers is an indicator of success for effectiveness of its advocacy to increase environmental and health consciousness. These may be reflected in the company's sales volume and market share increase which are indicators for business success.

One of the specific projects that the company is assessing is an investment to create a Global Food Application and Innovation Center, which will seek to further enhance its bioengineering capabilities and product improvement.

There have been several major undertakings by the company that were pursued based on recommendations from the Sustainability Team. These include the certification by Carbon Trust, being a signatory to The Climate Pledge, sustainability reporting, and engagement of contractors for capital projects.

The company's management and employee assessment metrics include sustainability goals and are incorporated in annual employee survey on colleague engagement.

IV. Resources: Walk the Talk

The company has made significant investments across its business operations to further progress on its sustainability goals. Between 2021 to 2023, the company plans to invest a total of US\$314 million for capacity expansion to meet growing demand, implement improvements in its manufacturing and product development capabilities, and emission reduction throughout its supply chain. US\$26 million is specifically allocated for the emission reduction projects. The company also committed at least GBP1 million annually for sustainable nutrition research. These innovations will contribute to sustainability by increasing manufacturing efficiencies and

productivity, while reducing its energy and water resource requirements. These investments will translate to less waste, lower resource intensity, product improvement, and enable wider availability and accessibility of Quorn as a sustainable food product. The allocated investment amount is inclusive of capital required to build a new research and development facility for flavor and culinary innovation, biotechnology research, new manufacturing technologies and equipment that will make the production processes more energy efficient. The investments have increased compared to previous years. The current allocation is considered sufficient for the projects identified thus far but may be scaled up in future stages as benefits are realized. By ensuring that all parts of the organization have aligned targets, there are essentially more than 940 individuals in the organization that are working towards the company's mission. The company plans to invest more in the future for capacity expansion, biotechnology capabilities, research, and food technology innovation.²³

V. The Future of Sustainability in the Organization

Quorn has successfully established itself as a pioneer in the meat alternative industry across its product offerings and business practices. It has a clear and funded business plan to achieve its goals that are aligned with its sustainability-oriented mission statement "To Provide Healthy Food for People and the Planet". The company's widely communicated top-down approach to sustainability further enhances its effectiveness in the internal organization to ingrain a strong sustainability culture.

To further improve on the company's efforts, it is pursuing investments for capacity expansion to increase its scale and work towards making Quorn products more affordable. Internally, there is an increasing effort to boost awareness and engagement about the Net Positive ambition and the process to achieve the goal. There are bespoke training and engagements ongoing across all units of the organization, tailored for various roles, functions, and knowledge level. The company is also working towards increasing the frequency of its sustainability reporting from bi-annual to annual.

Overall, Quorn has a well-established foundation of sustainability management that encompasses its product offerings, processes, capital allocation, and people. Sustainability will continue to be the driving force for the company's mission statement, strategic decisions, business goals, product innovation, investment decisions, and marketing strategy. Sustainability is not only a responsibility of one function but is an ingrained culture that guides how the organization operates.

Where Quorn can do better

To truly make Quorn products sustainable, it needs to be accessible. Other than the physical constraints of distribution and logistics, the company should continue to strive to lower its prices

to make it more competitive versus conventional animal meat products. According to a report from the World Economic Forum, alternative meats are more expensive than conventional meats since the latter already benefits from established and more industrialized supply chains.²⁴ The choice for shifting to more sustainable food choices will be strongly linked to products' accessibility and affordability. With the upcoming investments budgeted by Quorn for capacity expansion, this should yield to better economies of scale and more affordable products.

The inclusion of advocacy for fair public policy in the sustainability agenda will also be key to materially advance efforts in transitioning to sustainable diets.

It would also benefit the company to increase its brand visibility to the next generation of consumers through intensive market research, brand rejuvenation, and marketing campaigns. These initiatives will seek to effectively educate the public on responsible nutrition and can include active participation in global marquee events such as the UN Climate Change Conference and World Economic Forum, supplemented by social media and grassroots campaigns for improving health through sustainable nutrition.

Learnings from Quorn

The most notable aspect about Quorn's sustainability agenda is that it comes from the top and is integrated into its business and products, which effectively guides the company's strategic decisions, innovations, and investments. Quorn's Chief Scientific Adviser, Tim Finnigan, described the situation as "We can no longer separate the health of our bodies from the health of the planet." (Quorn Foods, 2019)²⁵ The organization also has a strong culture of continuous improvement and focus on leveraging technology and innovation. Even if they have pioneered many practices, they continue to try and do more which enforce the organization's sincerity in their sustainability goals. These attributes are generally applicable for all organizations and qualities that organizations can work towards. Other food industry players may also consider adopting Quorn's carbon footprint labeling and certification for products and use of recycled materials for packaging, which are best practices pioneered by Quorn in the alternative meat category.

Quorn's sustainability driven strategy makes it a future-proof enterprise across key aspects of product range, scalability, technology, and innovation. By providing better protein for everyone, it also does good for the planet.

Appendix

Figure 1. Sample carbon footprint label on Quorn product packaging.²⁶



Figure 2. Photograph of *fusarium venetatum* fungi spore (Quorn Foods, 2019, p. 11)²⁷

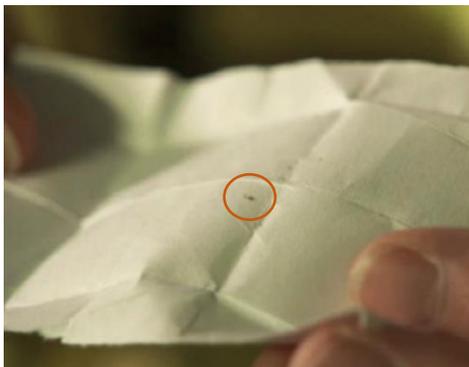


Figure 3. Quorn production process diagram (Quorn Foods, 2019, p. 5)²⁸

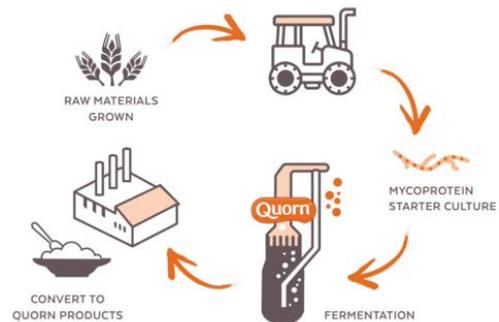


Figure 4. An open letter from Quorn CEO Marco Bertacca to COP26 delegates. Posted on Quorn Foods' LinkedIn page, 31 October 2021.²⁹

What a COP Out

An open letter to the 25,000 government delegates, campaigners and world leaders attending the United Nations Climate Change Conference in Glasgow.

We are at a pivotal moment in time. Our planet is under threat from the greatest humanitarian crisis in history.

The COP26 summit is our best last chance to limit global temperatures rising by 1.5°C and avoid dangerous climate change.

The future of our world hangs in the balance.

But one of the biggest contributors to global warming is missing from the agenda.

Meat is completely off the table.

One third of all global greenhouse gas emissions come from the food system and animal-based foods are responsible for over half of these.

Without a huge shift in how we farm, produce and consume food, we will remain on a collision course to climate catastrophe.

We must urgently limit the production of meat, while incentivising and subsidising the creation of new low-carbon food sources.

Unless action is taken to curtail non-sustainable foods, the future for the next generation looks bleak.

As the leading meat-free brand, with a mission to help the planet one bite at a time, Quorn is calling on those attending COP26, and the billions watching around the world, to put meat on the negotiating table.



Marco Bertacca, CEO



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