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Farming Scholarships

I can't believe it's not beef!

Can livestock compete with alternative proteins?

Written by:

Gary Spence NSch

February 2025

A NUFFIELD FARMING SCHOLARSHIPS REPORT

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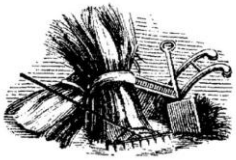

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NUFFIELD Farming Scholarships

"Leading positive change in agriculture. Inspiring passion and potential in people."

Date of report: February 2025

Title	I can't believe it's not beef! Can livestock compete with alternative proteins?
Scholar	Gary Spence
Sponsor	The Thomas Henry Foundation
Objectives of Study Tour	• Determine what concerns consumers have around red meat consumption. • Investigate the strengths and weaknesses of alternative protein technologies. • Make recommendations to the industry to ensure beef stays on our plates.
Countries Visited	In person: Australia, Ireland and USA Virtually: New Zealand, Netherlands, Switzerland, Finland, and Germany
Messages	• The alternative protein industry faces as may challenges as the beef industry. • Animal welfare in the UK is good but there is still room for improvement. • There are many ways to reduce beef's impact on the environment. • Technology exists to grade beef quality to ensure consumers get consistency in beef products. • We can do more to communicate our story to consumers and market beef products.

EXECUTIVE SUMMARY

Livestock production and meat consumption has been under intense scrutiny in recent years, being labelled as a major contributor to climate change and associated with negative impacts on human health.

This has led to the development of a plant-based meat alternative industry which has been hailed as a major solution to climate change and improved human health, particularly in 2019-2020 when this study began.

This study's original aim was to investigate the production of traditional protein and the new alternative protein technologies and find which product would dominate our plates in the future. Since then however, the world has changed, with a global pandemic and conflict interrupting food supply, affecting the general public's perceptions of food. Globally the share price of some of these major meat alternative companies have fallen dramatically as their products have failed to penetrate markets as expected so far. However, we are still seeing a change in consumer habits and as a livestock industry we need to adapt to changing consumer demands in how we produce red meat and market the products.

The study focused on identifying consumer concerns which include welfare, environment, cost, and product quality, and what we as an industry should do to respond to these concerns to ensure our products stay on the table. Each country has different expectations of what they want from red meat in particular flavour and how they expect the animals to be reared.

The study saw travel to Australia, Ireland, and the United States alongside many other countries virtually during the pandemic, including the Netherlands, New Zealand, Switzerland, Sweden, and Germany. Travel to major beef exporting nations who focus on consumer demand ensures customer satisfaction and has allowed business growth. Interviews were also conducted with many environmental and animal welfare NGOs to better understand wider concerns and recommendations for red meat production.

For a successful future, the UK red meat industry must take account of changing demands and react and build a resilient supply-chain focused on animal welfare, environmentally friendly products reducing climate impact while also improving wider biodiversity and water quality. The study recommends the need to focus on meat eating quality to ensure customers have a positive experience with our products every time they consume them. The United States and Australia have both implemented technologies to reward beef producers which have improved eating quality characteristics, and this study recommends that a similar approach should be taken in the UK. The report also recommends that each producer should review their business to identify and capitalise on their strengths, to produce beef in a way that is resilient to extremes and produce products that meet consumer demand.

TABLE OF CONTENTS

DISCLAIMER

The opinions expressed in this report are those expressed by the author and not those held by the Nuffield Farming Scholarship Trust or that of the Thomas Henry Foundation.

The report has been written giving an account of the authors travels and findings as part of a Nuffield Farming Scholarship Trust.

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CHAPTER 1: INTRODUCTION

I was brought up on a dairy farm in Kilkeel Co. Down surrounded by the Mourne mountains. The farm, however, transitioned to beef and arable in my early teens. I always had a love for livestock and the wider countryside from a young age.

I went on to study a foundation degree in agriculture at the College of Agriculture and Rural Enterprise, Antrim, which included a placement in Uganda working on agricultural development with a charity and local schools. I then went on to study an honours degree at Queen's University Belfast which included a placement with Devenish Nutrition who I went on to work for after graduating. This was an excellent job which introduced me to many interesting people including hosting many Nuffield scholars and the Global Focus Programme at the Dowth Research farm. This really encouraged me to apply for a Nuffield Farming Scholarship.

While working with Devenish on the soil improvement programme, we found that a lot of the issues in ruminant livestock nutrition came from poor quality forage. This led me to want to retrain as an agronomist and this finds me in my current role as forage technical manager for Fane Valley. In this role I am part of a team of agronomists who work with mainly mixed farms across Northern Ireland with a focus on producing quality forage.

My father and I run the farm in partnership; with both of us having full time jobs it can be quite busy. We rear dairy beef cross steers and bring them through to slaughter with a focus on maximising production from forage. We grow a small area of cereals for home use and contract rear dairy heifers. Since completing my travels, we are exploring a beef box business to sell our beef direct to consumers.

In my spare time I enjoy cooking for friends and family and spending time with my dogs. I particularly enjoy game shooting and working on conservation projects such as tree planting and pond creation on the farm's small shoot and another syndicate with which I am involved.

Figure 1: Author - Gary Spence at Rocky Mountain National Park, Colorado. Photo: Author's own.

CHAPTER 2: BACKGROUND TO MY STUDY SUBJECT

In 2019 when I began my Nuffield application it seemed that every week there was a negative headline concerning beef production or consumption. These included the World Health Organisation calling for a reduction in red meat consumption due to its potential carcinogenic effects. The Food and Agriculture organisations report “Livestock’s long shadow” stating that livestock farming was a key driver of climate change and a decline in biodiversity.

Other reports such as EAT-Lancet Commission presented a significant challenge to UK beef production, recommending a 90 per cent reduction in red meat consumption to 98 grams weekly, based on health and environmental concerns. This shift towards a plant-based "planetary health diet" could reshape market demands, requiring UK beef farmers to reevaluate their production methods, herd sizes, and marketing strategies.

Due to the information from reports like these and as part of a plan from Goldsmiths, University of London, to become carbon neutral, they became the first higher education institution in Britain to ban beef from its campus which made major headlines. Even while interviewing for my Nuffield farming scholarship in London, I was met by extinction rebellion protesters calling for change, which included a change to current farming practices. We had universities banning beef on campus and new alternative proteins coming from companies such as Impossible Foods or Beyond Meat being heralded as the way forward to a utopian society.

As a proud eighth generation livestock farmer, I and many others struggled with these headlines. They felt like a personal attack on our identity and way of life. Most beef farmers like me have been trying to do our best to look after our animals and the environment and have followed industry and government advice to develop the systems we currently have.

This study aim is to find solutions for my family business and others like it to find a way to survive in the future and ensure our products continue to form a part of people’s diets.

CHAPTER 3: MY STUDY TOUR

In November 2019, I received my Nuffield tie and was told to go out and explore the world. However, by March 2020, it became evident that my Nuffield experience would not proceed as planned.

I started my study in December 2019 with a short trip to businesses in Ireland and started to plan trips in Australia and New Zealand around the 2020 Contemporary Scholars Conference in Brisbane. Before I set off on my travels there were rumours of a new disease that we would very soon become familiar with. Visits in Australia were disrupted even before the pandemic and I found myself trapped on a farm in Mooree, New South Wales due to flooding. Whilst in Australia I wanted to focus on how a large beef exporter feels about alternative proteins and what steps they are taking to combat the negative press. I then had plans to travel to New Zealand after the CSC but, with the border being closed, this was no longer possible. I had wanted to extend my time in Australia, but this did not come to fruition, and I ended up with the last seat on a plane home on March 18th, 2020.

Even though travel was disrupted. I tried to maintain what meetings I had planned for New Zealand virtually and had a target to have a meeting at least every 14 days via Zoom to keep my study going. This involved searching the term “alternative proteins” into LinkedIn and speaking to anyone who would have me. This included meeting with the Vegan Society, WWF, and meat technology companies amongst many others. This 14-day target was not always maintained as new projects took more time during the pandemic period, but it was a great benefit as, when I was able to travel again, I was able to ask better questions and get more out of my visits.

It was September 2022 before my next major trip which took me to the United States for four weeks. The trip started in California, visiting ranchers, research institutions and retailers. The vast array of crops that were grown in the San Joaquin Valley was truly eye opening to the scale of agriculture in California. I then travelled to the Mid-West, to Colorado and Nebraska where I really fell in love with America, the breathtaking scenery, and the passionate producers I met there.

Even though my study tour did not look like I had imagined in November 2019, it was a truly life changing experience and allowed me to meet so many enthusiastic people involved in all aspects of agriculture.

CHAPTER 4: THE RISE AND FALL OF ALTERNATIVE PROTEINS

A meat alternative or meat substitute is a food product made by fermenting plant or animal cells. Meat alternatives typically approximate qualities of specific types of meat, such as mouthfeel, flavour, appearance, or chemical characteristics**.** These alternative products have been heralded as a solution to the many problems caused by traditional red meat production and consumption.

The rise of meat alternatives has been driven by growing concerns about environmental sustainability, animal welfare, and health consciousness among consumers. As of 2020, the global meat substitutes market was valued at approximately $4.9 billion and was projected to experience substantial growth in the coming years. Plant-based meat alternatives, primarily made from soy and wheat proteins, have gained considerable traction, with major food companies and fast-food chains introducing their own product lines to meet the increasing demand. Beyond Meat and Impossible Foods have emerged as industry leaders, offering products that closely mimic the taste and texture of traditional meat, but other traditional protein producers have also invested heavily.

The market has also seen innovations in other alternative protein sources, such as insect-based products and cultured meat, although these are still in early stages of development.

4.1 How alternative proteins are produced?

Plant-based proteins have a long history, dating back thousands of years. Tofu is one of the earliest plant-based proteins which was developed in China during the Han Dynasty 206 BCE–220 CE. Through different cultures and times there have been many others produced such as mincemeat made from almonds and grapes, which Europeans made to help observe lent in medieval times right through to cultured meat mimicking products we see on the shelves today.

Tofu

Tofu is a versatile plant-based protein made from soybeans. It has been a staple in East Asian cuisines for over 2,000 years and has gained popularity worldwide as a meat alternative.

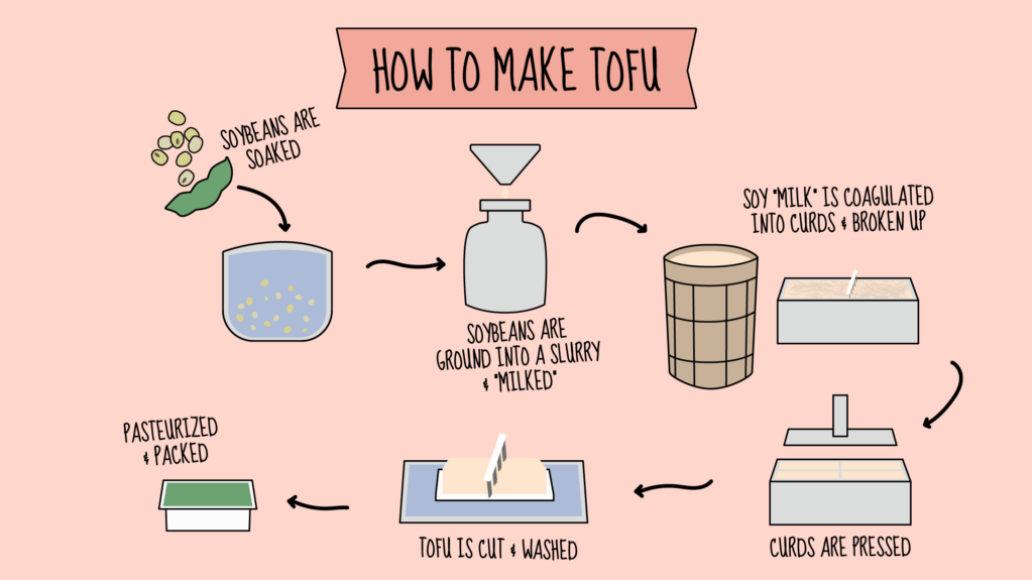

Figure 2: The Tofu Manufacturing process. https://sarahsvegankitchen.com/recipes/homemade-tofu/

Quorn

Quorn is the trademarked product made from mycoprotein. This plant-based protein is derived from a natural fungus called *Fusarium Venenatum*. The fungus is fermented in a similar way to beer or yogurt to promote the growth of the mycoprotein.

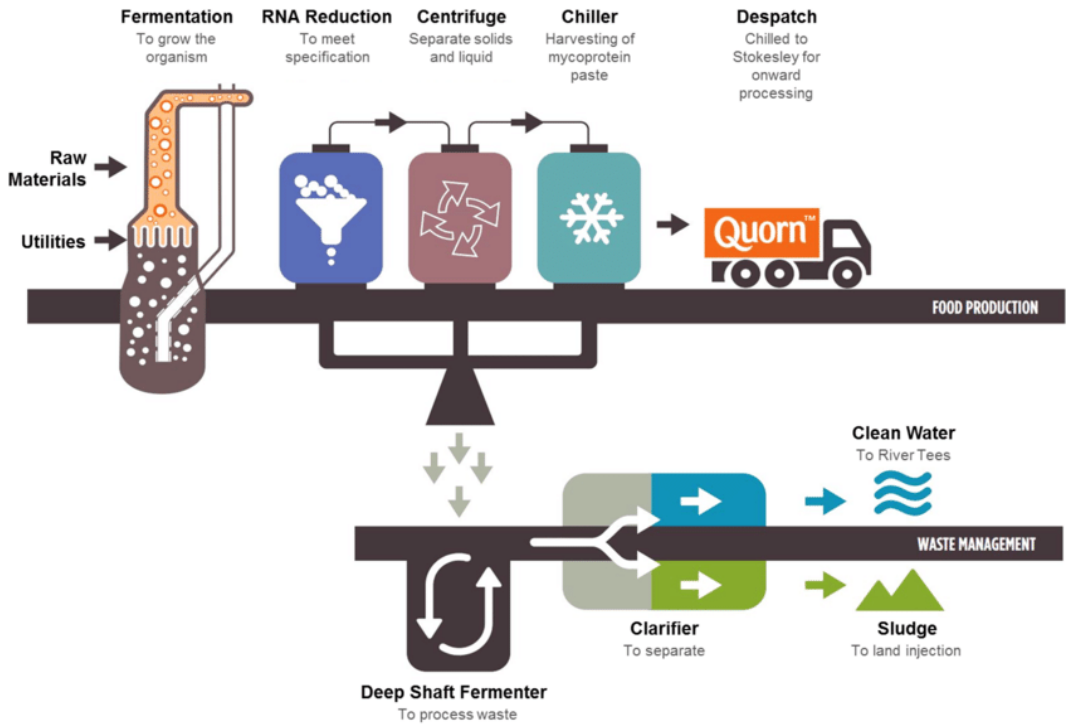

Figure 3: The Quorn manufacturing process. https://www.nepic.co.uk/wp-content/uploads/2018/08/Quorn-Steve-Finn.pdf

Insect Proteins

Insects are raised in controlled environments, such as indoor facilities or specialised farms. The most farmed insects for protein production include:

- Black soldier flies
- Mealworms
- Crickets

Once the insects reach the appropriate stage of development, they are harvested and processed, the insects are typically sieved and collected from their rearing containers and are then washed to remove debris and excrement. The insects are killed using heat treatment to eliminate any potential pathogens and then dried and ground to produce a powder of meal.

There is, however, a lot of regulation around insect farming in Europe and the UK which many other Nuffield scholars have been investigating.

Modern Plant-Based Substitutes

Plant-based meat substitutes are produced through a sophisticated process that combines advanced food science and technology to create products that closely mimic the taste, texture, and appearance of animal meat.

Raw materials used can include soyabeans, peas and grains. The products are extruded to concentrate their protein content. The product is then flavoured, coloured, and incorporated with fat to give an eating experience similar to meat.

Cell-Based Meat

Cell-based meats are produced by growing animal cells in a controlled laboratory environment, without raising and slaughtering animals. The process begins by obtaining stem cells from a living animal through a small biopsy. These cells are then placed in bioreactors containing a nutrient-rich growth medium, where they multiply and differentiate into muscle, fat, and connective tissues. Once the desired cell density and tissue formation are achieved, the cultured meat is harvested and undergoes food processing steps such as moulding, colouring, and seasoning.

The final product can be formed into various meat products like burgers or sausages. While this technology offers potential environmental and ethical benefits, challenges remain in scaling-up production, reducing costs, and improving texture to match conventional meat. Ongoing research and development efforts are focused on overcoming these hurdles to bring cell-based

meats to the commercial market.

Figure 4: Lab grown meat. https://new-harvest.org/cellular-agriculture-image-library/

One innovative company, Vow, is looking at using this technology to allow consumers to try long since extinct or endangered animals.

4.2 v2food

v2food is an Australian-based company founded in 2019 that produces plant-based meat alternatives using protein extracted from legumes. The company was established through a partnership between Jack Cowin's Competitive Foods Australia and CSIRO's investment fund Main Sequence Ventures, with the goal of creating sustainable food options to address the growing global demand for protein. v2food's product range includes plant-based burger patties, mince, sausages, and chicken alternatives, which are designed to replicate the taste, texture, and cooking features of animal meat. The company has gained significant traction in the market, becoming the most funded alt protein producer in Australia with a total capital raise of US$138 million. v2food's products are available in supermarkets and fast-food chains, including Hungry Jack's in Australia and Burger King in several Asian countries. With a focus on sustainability and food security, v2food aims to expand its reach globally, particularly in the Asian market, to address the challenges of feeding a growing world population while reducing the environmental impact of traditional meat production.

Figure 5: v2food. https://v2food.com/plant-based-products/burger

I met with Nick Hazell their CEO in March 2020 to get his perspective on alternative protein markets. Nick introduced himself as the CEO of a meat company who loves steak, which initially caught me off guard. He said that the alternative protein industry would not be an end to meat production but that there was a massive demand on the protein market, and this was one part of the solution for the trillion-dollar industry.

"v2food products are not targeted to vegans as the market is too small, we are targeting the ethical meat eater." Nick Hazell

The company is called v2food (v2) as they claim that the current version of agriculture is broken, and it is not working for anyone but the large multi nationals. Farmers are finding it harder and harder to make a profit and are stuck in a cycle of soil degradation. They want to help farmers develop sustainable farming systems. v2 offers a more sustainable version of a food system have a policy of only buying sustainably sourced soya (not currently GM) and could buy all the soya being produced in Australia.

"Plant based or livestock are not inherently sustainable, you can find extremely unsustainable values in both." Nick Hazell

Nick's biggest concern for growth of v2food is not that of poor-quality competitors. If consumers try similar products that result in a negative eating experience, they will not try v2's products.

4.3 Micarna Foods, Simply Bugs

Micarna part of the Migros Group is Switzerland's largest meat producer in terms of turnover, offering more than 4,500 products and complete solutions for specific customer groups both in Switzerland and abroad. The company serves over two million consumers daily, providing high-quality products across various categories. Micarna is committed to environmentally and socially sustainable practices: Approximately 70 per cent of processed livestock are animals sold through higher end brands (e.g., TerraSuisse or Bio), ensuring higher animal welfare standards than legally required.

Figure 6: Simply Bugs Product label. https://www.migros.ch/en/product/mo/5751982

Migros Group started SimplyBugs as part of their initiative to explore alternative protein sources and expand into innovative food products. Ralph Langholz, who is now the head of alternative proteins at Micarna, built and launched insect-based food products through the SimplyBugs. SimplyBugs products are made from mealworm flour and other natural ingredients such as carrots, leeks, or chickpeas.

All products are natural, GMO-free, with no flavour enhancers or other chemical ingredients.

" We use insects as protein suppliers and interesting flavour components in the manufacture of meat-free products. For us the processing of insects is not competition for meat, but rather an exciting addition to our menu." Ralph Langholz

Simply Bugs products are available in limited stores and to buy online but sales have not taken off, much of this down to consumer perception of eating insects.

4.3 Gold & Green

Gold & Green Foods, founded in 2015 in Finland, is a food tech company specialising in the development and production of innovative plant-based protein foods. Their flagship product, Pulled Oats, combines oats, peas, and fava beans to create a versatile and nutritious meat substitute. The company's product line has expanded to include protein granules, flakes, and ready-to-use items like nuggets, cutlets, and dices. Gold & Green focuses on creating clean-label,

sustainable plant-based foods that cater to health-conscious consumers and flexitarians alike.

Figure 7: Gold & Green Pulled Oats https://www.pauliggroup.com/news/revolutionary-finnish-innovation-pulled-oatsr-lands-in-australia

I had a virtual meeting during the pandemic with Andrew Ely, the UK launch manager, who told me the founder, Maija Itkonen, has never eaten meat and because of this they have a different approach to protein production. They do not want their product to mimic meat; they want a stand-alone, tasty product using Nordic oats.

Gold & Green are unique as they are utilising a product which could be grown across many areas of the UK and Ireland giving an opportunity for livestock farmers to convert to arable.

4.5 The Fall of Alternative Proteins

Plant-based meat products have had a rocky road over the last few years; companies such as Impossible Foods and Beyond Meat were on a meteoric rise when I began this study but have since experienced notable setbacks marking what some experts consider the biggest failure in food industry history. However, the market size remained a fraction of the traditional meat industry with the overestimation of market potential resulting in unrealistic growth projections and subsequent disappointment.

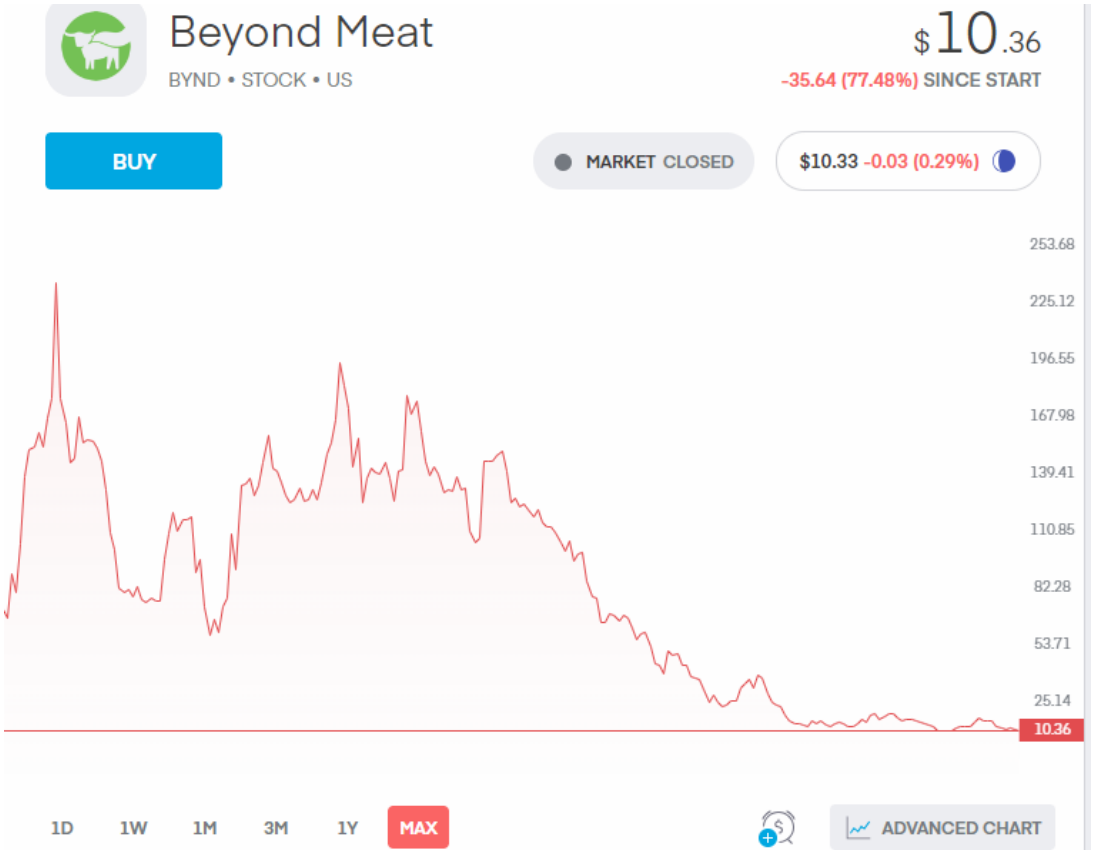

Figure 8: Beyond Meat share price information. Source etoro

As Nick Hazell of v2foods feared during my interview in 2020, consumer expectations regarding taste and texture have proven difficult to meet consistently. Many consumers find that plant-based products fail to replicate the sensory experience of traditional meat, leading to low repeat purchase rates. As health-conscious consumers initially drove demand, and with growing concerns about the nutritional value of plant-based alternatives, many products fell into the category of ultra-processed foods, which contribute to the same health issues of processed meat products.

Economics have been a continuing struggle with plant-based products remaining at a premium over alternative protein products. The cost of production has remained high for alternative protein products due to the complex manufacturing process and expensive ingredients. These factors, coupled with the challenging economy brought on by the pandemic, have been a contributing factor to low sales.

Whilst significant challenges have been faced by the alternative protein space, it is too soon to call the industry a failure; the sector will learn from its mistakes and with future technological advancements will become more efficient.

CHAPTER 5: CONSUMER TRENDS

Even though alternative protein products have not proven to be the threat they appeared to be initially, consumers continue to have concerns around meat consumption. From 1980 to 2022, the UK's combined consumption of beef, pigmeat, and sheep meat decreased by almost 62 per cent. In 2022, the average annual consumption of beef per person was 5.0 kg, down from 14.5 kg in 1980. I interviewed Kim Health from the Agriculture and Horticulture Development Board (AHDB) to look at market and consumer trends.

Figure 9: AHDB Consumer Insights Report https://ahdb.org.uk/news/consumer-insight-trust-in-british-agriculture-and-consumer-perceptions-on-the-environment

5.1 Health

"Only 24 per cent of consumers interviewed think beef is part of a healthy diet" Kim Heath

Nutritional Concerns

Health experts warn that reducing meat consumption due to cost pressures could lead to nutritional deficiencies:

- One in four UK women and 49 per cent of girls and young women aged 11-18 already have a low intake of iron.
- Cutting back on meat and dairy could increase the risk of deficiencies in key nutrients such as vitamin B12 and iron.
- AHDB's "We Eat Balanced" campaign, aimed to educate consumers about the importance of including red meat and dairy in a balanced diet:

- The campaign highlighted that meat and dairy are sources of vitamin B12, which is not naturally present in plant-based foods.
- It emphasised that red meat contains up to nine micronutrients, some of which are difficult to obtain from other food sources.

5.2 Cost

Cost-of-Living Impact

The cost-of-living crisis has significantly influenced consumer behaviour and attitudes towards red meat consumption:

- 33 per cent of respondents in an AHDB survey agreed that the cost-of-living crisis had made their diet less healthy.
- 28 per cent of consumers reported eating less meat to try and save money.
- £7.40/kg for meat alternatives vs £6.46/kg for animal protein.

5.3 Environmental

Greenhouse Gas Emissions

Consumers are particularly concerned about methane emissions from livestock, which is one of the major factors influencing overall perceptions of farming's environmental impact. This concern is especially pronounced among meat reducers.

Land and Water Use

There are worries about water usage in British crop production, which indirectly affects beef production through feed crops. Additionally, concerns about habitat destruction and loss of native UK species due to farming practices have been noted.

Food Miles and Imports

Consumers express concern about the environmental impact of importing meat products, including beef, from countries like Australia, New Zealand, and the US. About 54 per cent of consumers are ‘somewhat’ or ‘very concerned’ about this issue.

Gradual Reduction in Consumption

There has been a gradual erosion of red meat consumption over the long term, with some consumers becoming unconscious meat reducers. While health is the most cited reason for reducing meat consumption, environmental concerns have shown the strongest growth as a factor influencing this trend.

Trust and Positive Perceptions

Despite concerns, farmers continue to be the most trusted part of the food supply chain, with 65 per cent of consumers agreeing that farmers care about the

planet. However, this trust varies by dietary choice, with meat reducers and vegetarians/vegans more likely to view UK farming negatively in terms of environmental impact.

5.4 Animal Welfare

According to AHDB reports, the main welfare concerns for consumers regarding animal production include:

Specific Welfare Issues

- Access to outdoors: Consumers associate higher welfare with outdoor access and practices like free-range, outdoor reared/bred, and organic production.
- Overuse of antibiotics: 37 per cent of consumers are concerned about antibiotics given to animals being harmful to consumers.
- Cow-calf separation: This is a specific concern in dairy production.
- Health-related issues: Consumers worry about problems like lameness and mastitis in cattle.
- Mutilations: Practices such as dehorning are concerning to consumers when prompted.
- Use of artificial hormones: 45 per cent of people are concerned about the use of artificial hormones in farm animals, despite this practice being banned in the UK since 1989.
- Confinement: 43 per cent of consumers incorrectly believe that cattle live in confinement all their lives.

Figure 10: Dehorning a calf. https://pplx-res.cloudinary.com/image/upload/v1741887546/user_uploads/KdJqJGcgHgMIgmj/image.jpg

General Perceptions

- Humane treatment: 40 per cent of consumers express they are very concerned about the humane treatment of farm animals.
- British standards: 79 per cent of British consumers believe that the UK has high welfare standards.
- Trust in farmers: 71 per cent of consumers rate farmers as trustworthy regarding animal care.

Impact on Purchasing Behaviour

- While 89 per cent of consumers claim animal welfare is important to them, it becomes less of a consideration at the point of purchase.
- Price often overrides welfare concerns, with only 12 per cent of pig meat sold by retailers being outdoor bred, outdoor reared, or free-range.

AHDB emphasises the need for the industry to ensure good compliance with existing welfare standards on-farm and to address misconceptions through education and transparency.

5.5 Eating Quality

UK consumers have several concerns about beef eating quality, which can be summarised as follows:

Sensory Attributes

- Tenderness: This is a key factor in consumer satisfaction with beef quality.
- Juiciness: Consumers expect beef to be adequately juicy when consumed.
- Flavour: The taste of beef is crucial for overall enjoyment and repeat purchases.

Figure 11: A high-quality British steak. Photo: Author's own.

Consistency and Expectations

- Consumers expect good quality when they eat beef, but the actual eating experience may not always match their expectations.
- There is often a discrepancy between the price paid and the quality of the product. Sometimes higher priced products fail to meet expectations.
- Maintaining consistency between expectations and actual experience is crucial for long-term consumption levels.

Quality Indicators

- Marbling: While higher marbling levels contribute to better eating quality, some consumers may perceive it negatively due to health concerns.
- Quality grades: Consumers are willing to pay more for beef with higher quality grades, as they associate these with better eating experiences.

Origin and Production Methods

- British origin: UK consumers generally have a positive perception of domestically produced beef.
- Production systems: There is interest in grass-fed, free-range, and organic production methods, which consumers often associate with better quality.

Health and Safety

- Fat content: Consumers are interested in lean cuts and low-fat options.
- Nutritional value: There is a growing awareness of the nutritional aspects of beef, including vitamin and mineral content.

Information and Labelling

- Consumers appreciate clear labelling that includes information on origin, production methods, and cooking instructions.
- Visual appeal: Packaging with appetising imagery of prepared dishes can influence purchase decisions.

Trust and Transparency

- Consumers value transparency in the supply chain and trust in farmers and producers.
- There is a need for accurate information to counter misconceptions about production practices.

Addressing these concerns through education, transparent communication, and consistent quality control can help improve consumer confidence in beef eating quality.

CHAPTER 6: ANIMAL WELFARE SOLUTIONS

As highlighted before, animal welfare is a key issue which prevent consumers from purchasing beef products. I visited many different companies which had tackled animal welfare issues head-on and have reported on a number of these below.

6.1 Australian Eggs

Australian Eggs is a producer-owned corporation that serves as the major marketer of eggs in Australia. Representing approximately 400 commercial egg producers, the organisation is based in Sydney and plays a crucial role in the Australian egg industry.

Australian Eggs focuses on several important areas:

1. **Marketing**: Promoting egg consumption and raising awareness about egg products.
2. **Research and Development**: Investing in studies to improve egg production and quality.
3. **Policy Services**: Providing guidance on industry-related policies.

Australian Eggs advocates for all aspects of the egg industry, helping Australian egg farmers implement sustainable practices that prioritise animal care and environmental stewardship. Their goal is to set high standards for quality, nutrient-rich eggs across the country.

Challenges

Despite its prominent role in the industry, Australian Eggs has faced some criticism:

- Animal welfare organisations have questioned the use of certain terms for promotional purposes.
- In 2013, the organisation proposed changing the definition of free-range eggs from 2,000 hens per hectare to 10,000 hens per hectare, leading to a super-complaint from consumer rights organisation Choice.
- In 2018, 75 per cent of Australians were concerned about the welfare of battery-caged layer hens.
- 80 per cent of Australians want battery cages phased out.

Communication

I met with the CEO Rowan McMonnies who addressed the challenges head-on to improve the perception of the Australian egg industry. He had an opinion of "Why should we be afraid to lay it all out? If you are doing something on your farm you would not want the public to see, why are you doing it?" It is the things that we do not show that anti-farming lobbies exaggerate as problems.

"Why should we be afraid to lay it all out? If you are doing something on your farm you wouldn't want the public to see, why are you doing it?" Rowan McMonnies, Australian Eggs

Rowan had the opinion that the agriculture industry communicates badly, we like to tell everyone what we are the best at, but we need to treat it like a human conversation, be honest and authentic.

Australian Eggs CSR report

The Australian Eggs 2020 Sustainability Framework Report, compiled by CSIRO researchers, highlights significant progress in the egg industry's environmental and social performance. The findings were communicated to consumers through marketing campaigns.

Figure 12: Rowan McMonnies Image Source https://www.australianeggs.org.au/news/aecls-new-managing-director

Environmental Improvements

The Australian egg industry has made notable strides in reducing its environmental footprint:

- Cut grain use by 42,000 tonnes.
- Saved 30,000 tonnes of carbon emissions.
- Lowered environmental impact through better genetics and improved farm management.
- Increased uptake of on-farm solar power.
- Implemented new waste management technologies, including converting manure into organic fertiliser.

Hen Welfare and Biosecurity

The industry has focused on enhancing hen welfare and biosecurity measures:

- Implemented virtual reality training for biosecurity improvements.
- Trained egg farmers in new skills to raise standards in animal husbandry.

Food Security and Rural Livelihoods

The report emphasises the industry's contribution to food security and rural economies:

- Produced an additional 800 million eggs compared to 20 years ago.
- Created a risk assessment tool to help farmers maintain profitability.

Community Trust and Perception

The CSIRO's community research revealed increased trust in the egg industry:

- 64.2 per cent of Australians trust the egg industry to act responsibly.
- 62.8 per cent believe the industry does what is right.
- 57.3 per cent trust the industry to act in the best interests of society.
- Overall trust in the egg industry has risen by an average of 4 per cent each year since 2018.

Figure 13: Australian Eggs CSR Image source: https://www.australianeggs.org.au/what-we-do/sustainable-production/sustainability-report

6.2 Five Rivers Cattle

Five Rivers Cattle Feeding is the world's largest cattle feeding operation, with a history dating back to the 1920s. The company operates 11 feedyards across six U.S. states, including Arizona, Colorado, Idaho, Kansas, Oklahoma, and Texas. With a one-time feeding capacity of over 900,000 head of cattle, Five Rivers markets more than 1.8 million head of cattle annually. The company has a focus on sustainability, focusing on key areas such as

Figure 14: Cattle at Five Rivers Kuner, Colorado. Photo: Author's own.

water management, animal welfare, team member health and safety, product integrity, and energy and climate change. Five Rivers prides itself on providing high-quality fed cattle, including conventional, natural, certified humane, and source-verified beef products, while maintaining a responsible and environmentally friendly approach. The company employs over 600 skilled professionals and continues to be a leader in innovation and stewardship in the cattle feeding industry.

The Kuner Feedlot which I visited is operated by Five Rivers Cattle Feeding and is state-of-the-art cattle feeding facility located in Kersey, Colorado. Originally completed in 1974 as a 98,000-head feedyard, it has since grown to become a significant player in the cattle feeding industry.

Key Facts Kuner Feedlot

Total capacity	100,000 head
Space per head	48m2
Days on feed	150-180
Daily feed use	1,134t
Average Daily Gain	1.59kg (1.27kg Aspen Ridge)
Feed Conversion Ratio	5.8kg/DM (7.5kg/DM Aspen Ridge)

Low-Stress Animal Handling

The Kuner Feedlot, one of Five Rivers' facilities, underwent a major redesign in 2011 with input Dr Temple Grandin, an influential animal behaviourist . This redesign focused on creating a low-stress environment for cattle, ensuring easy flow through buildings and prioritising animal comfort.

Dr Temple Grandin has profoundly impacted the livestock industry through her innovative designs and advocacy for humane animal handling. Diagnosed with autism at a young age, Grandin leveraged her unique visual perspective to understand animal behaviour, leading to the development of low-stress handling systems. Her designs, such as the centre track restrainer system, have been adopted by half of North America's meat plants, significantly reducing animal stress and improving handling efficiency. Grandin's work has transformed the industry, making it safer for both animals and workers. She has also developed objective scoring systems to assess animal welfare, further enhancing industry practices. Her influence extends globally, with her designs used in facilities across multiple continents. Grandin's contributions have been recognised internationally, including being named one of TIME Magazine's "100 Most Influential People in the World" in 2010.

Beef Quality Assurance (BQA) Implementation

BQA principles form the core of daily operations at Five Rivers feedlots. The company emphasises:

- Training employees on the importance of health management.
- Implementing best practices for cattle care.
- Using BQA guidelines as the foundation for animal handling and welfare.

Research and Collaboration

Five Rivers actively participates in research to improve cattle comfort and efficiency:

- Partnering with universities and industry organisations to develop new solutions for sustainable livestock management.
- Supporting AgNext, a research collaborative working towards a sustainable future for the livestock industry.

Transparency and Education

The company promotes beef production through public engagement:

- Hosting over 100 feedlot tours annually, educating visitors about cattle care and BQA guidelines.
- Using social media to share the beef production story and spotlight dedicated team members.

Staff Training and Incentivisation

The company encourages employees to put animal welfare first:

- Pen riders identify ill animals and bring them to a hospital pen to be treated by the onsite veterinary technician.
- Pen riders have a KPI that 85 per cent of the animals pulled from pens should require attention. If 95 per cent of the animals pulled need attention it is likely there are sick animals in the pen.

Aspen Ridge

Aspen Ridge is a premium Natural Angus beef brand offered by Five Rivers Cattle Feeding. This high-quality beef product line is characterised by several key features:

Figure 15: Kim Rounds, Specialty Beef Manager, Five Rivers Cattle. Photo: Author's own.

Genetic Quality

The beef comes from cattle with verified Angus genetics, which is known for its superior marbling and flavour.

Antibiotic-Free

Aspen Ridge cattle are raised without the use of antibiotics, contributing to the brand's all-natural appeal.

Sourcing

The cattle are sourced from family-owned, U.S. ranches, emphasising domestic production and supporting local agriculture.

Quality Assurance

Aspen Ridge beef is part of a "never-ever" programme, meaning the cattle have never been given any growth promotors, antibiotics, or animal by-products. The cattle are 100 per cent vegetarian fed and undergo third-party animal handling certification to ensure humane raising and handling.

6.3 Cow Signals

Cow Signals is a concept developed in the Netherlands, to improve animal welfare by focusing on understanding and responding to cows' body language and needs.

I met founder Joep Driessen when he presented at a conference in Northern Ireland and discussed his approach to animal welfare. This approach enhances both cow and farmer well-being through several key methods:

Observation and Understanding

Cow Signals teaches farmers and dairy professionals to:

- Recognise and interpret cow body language, allowing for early detection of health issues or discomfort.
- Observe from the "big picture down to the smallest detail," considering the herd, groups, individual cows, and specific body parts.
- Focus on meeting cows' basic needs: feed, water, light, air, rest, space, and good health.

Practical Solutions and Prevention

The Cow Signals approach emphasises:

- Providing practical training to farmers, addressing the lack of continuous education in the agricultural sector.
- Focusing on disease prevention rather than just treatment, which is more effective for long-term animal welfare.
- Implementing the Cow Compass, a management tool that tracks seven areas of cow health and welfare, helping farmers identify and address potential issues proactively.

Holistic Approach

Cow Signals promotes a comprehensive view of dairy farming:

- Encouraging advisors to understand factors outside their expertise, such as how housing impacts feed intake.
- Addressing both animal welfare and economic aspects, recognising that healthy cows are more productive and profitable.
- Improving barn design to prioritise cow comfort, including sufficient light, fresh air, space, and good hygiene.

Stress Reduction

The programme emphasises stress-free interactions with cows:

- Teaching stress-free stockmanship techniques to reduce accidents and improve cow well-being.
- Promoting quiet approaches to handling cows, which can reduce lameness and increase milk production.

Continuous Improvement

Cow Signals fosters ongoing development:

- Encouraging farmers to share practical solutions and learn from each other.
- Providing various training programmes, including online courses and in-person workshops, to continuously educate farmers and dairy professionals.

By implementing these practices, Cow Signals has successfully improved animal welfare while also enhancing farmer satisfaction and dairy farm productivity. This approach not only benefits the cows but also contributes to more sustainable and efficient dairy farming practices.

CHAPTER 7: ENVIRONMENTAL SOLUTIONS

The environment is one of the major factors that make negative headlines regarding the beef industry.

7.1 UC Davis

The UC Davis CLEAR Centre (Clarity and Leadership for Environmental Awareness and Research Centre) is a research and extension organisation dedicated to advancing sustainability in animal agriculture. Led by Dr Frank Mitloehner and based in the Department of Animal Science at the University of California, Davis, the CLEAR Centre focuses on two main areas: research and extension.

Figure 16: UC Davis Clear Centre team. Photo: Author's own.

Research and Extension

The CLEAR Centre's primary goal is to help the animal agriculture sector operate more efficiently while reducing its environmental and climate impact. Some of their key activities include:

1. Quantifying and mitigating greenhouse gas emissions from livestock.

2. Conducting field work on farms to find practical solutions.

3. Collaborating with various stakeholders in the food supply chain.

Approach and Collaboration

The CLEAR Centre emphasises collaboration and engagement with multiple stakeholders:

- They have formed an advisory board comprising various companies in the agricultural sector to gain diverse perspectives and build trust.

- The centre works closely with policymakers, researchers, the agriculture sector, and NGOs to create a food system that promotes personal and planetary health.

Public Engagement

In addition to research, the CLEAR Centre actively engages with the public, media, and thought leaders to:

1. Help develop a better understanding of the role of agriculture in nourishing the world.

2. Focus attention on cleaner air and a healthy climate.

3. Present accurate research on animal agriculture and air quality in relation to climate.

The CLEAR Centre aims to provide science-based information and solutions to address important economic, agricultural, natural resource, youth development, and nutrition issues, both locally and beyond.

Key Challenges and Opportunities

Extensive Management Systems: The bulk of methane emissions (82 per cent) from beef cattle production come from cattle on pastures rather than those in feedyards. This presents a unique challenge for developing solutions to lower enteric CH4 emissions in extensively managed (grazing) cattle.

Innovation Needs: To address these challenges, the CLEAR Centre emphasises the need for:

- Development and adoption of new innovations.
- Solutions for lowering enteric CH4 emissions in grazing cattle.
- Low-CH4 emitting breeding strategies.
- New feed additives for pasture-based systems.

Emissions Measurement and Reporting

The CLEAR Centre's research also reveals the importance of accurate emissions measurement and reporting:

- Using Global Warming Potential (GWP100) can lead to an overestimation of the warming impact of beef cattle's direct greenhouse gas emissions by 88per cent in scenarios with falling emissions.

- They suggest using carbon dioxide warming equivalents (CO2we) instead of carbon dioxide equivalents (CO2e) for more accurate representation of warming impacts.

These findings underscore the complexity of achieving sustainability in beef production and highlight the need for innovative solutions and accurate measurement techniques to guide the industry towards climate neutrality.

7.2 University College Dublin - Smart Sward

The University College Dublin (UCD) Smart Sward project, which evolved from the original Smart Grass initiative, is a pioneering research effort aimed at enhancing the sustainability of grass-based livestock production systems in Ireland. Here is a summary of the project's key aspects:

Project Overview

Smart Grass was the first nationally funded research project in Ireland to demonstrate that the sustainability of grass-based livestock production systems can be significantly improved through the adoption of multispecies swards (MSS). This approach shifts the focus from chemical inputs to biological solutions, aiming to increase animal performance, biodiversity, and profitability while reducing negative environmental impacts associated with meat production.

Figure 17: Tommy Boland and Helen Sheridan, UCD. Photo: Author's own.

Key Findings and Impacts

Agricultural Benefits

- Improved Performance: The project showed significant advantages in ewe and lamb performance when using multispecies swards.
- Reduced Chemical Inputs: MSS require less than half the amount of nitrogen fertiliser compared to traditional perennial ryegrass (PRG) systems, while yielding similar amounts of quality herbage.

- Animal Health: Lambs grazing on MSS reached target slaughter weights about two weeks earlier and required about 50 per cent less worm treatment than those grazing on PRG.

Environmental Sustainability

- Greenhouse Gas Reduction: Potential emissions reductions of up to 90 per cent in nitrous oxide compared to PRG swards.
- Biodiversity Support: MSS were found to support greater biodiversity both above and below ground compared to PRG swards.

Impact on Policy and Industry

- The project's findings have influenced national policy discussions related to sustainable agriculture.
- There has been an eight-fold increase in MSS seed sales in 2020-21 compared to the previous five years, indicating growing farmer interest.
- The research has been presented at Department of Agriculture, Food and Marine (DAFM) events and disseminated to policymakers.

7.3 Teagasc BEEF 2022

I attended the Teagasc Beef 2022 event at Teagasc Grange in July 2022 where the event focused on “Supporting Sustainable Beef Farming”. This event highlighted research conducted in Ireland to drive sustainable beef production.

Beef Production Systems

Beef production in Ireland is made up of several different systems which complement the many varying land types and factors affecting management on farms. Teagasc ran comparisons based on the varying systems to look at profitability and greenhouse gas emissions.

Figure 18: Teagasc Beef 2020 Open Day https://www.teagasc.ie/animals/beef/grange/

Suckler Beef Systems

In general, suckler beef production systems can be categorised as cow-calf systems producing weanlings and weanling-to-beef systems. The Irish suckler herd is predominantly spring calving. The objective is to align calving date, and the period of greatest nutritional demand from the cow, with the onset of the grazing season. Cows suckle their calf over a grazing season of six-to-nine months after which calves are weaned and sold as weanlings or retained and sold as stores. Some integrated systems will follow on to finish.

The finishing systems can vary from concentrate to forage-based systems with the later usually reaching slaughter later.

Dairy calf-to-beef systems

The expansion of the dairy cow herd has given rise to a greater availability of dairy-origin calves for beef production. Production systems are broadly like those which pertain for suckler progeny. However, the genetic merit of these animals can be lower resulting in poorer carcasses and poorer feed efficiency.

Summary of the performance, profitability, and greenhouse emissions for different beef systems from spring born male animals.

	Suckler Beef			Dairy Beef			
	Age at slaughter						
	<16mth Bull	21mth Steer	23mth Steer	20mth Steer	22mth Steer	24mth Steer	26mth Steer
Forage in Diet (per cent DM basis)	0.52	0.82	0.85	0.77	0.81	0.79	0.88
Concentrate (kg DM/head)	1100	475	585	701	702	878	578
Carcass Weight (kg/head)	360	343	385	282	308	332	343
Production costs (€/kg carcass)	4.59	4.41	4.64	3.89	3.96	4.29	4.10
Net margin (€ per head)	201	272	237	279	283	193	264
GHG emissions (kg CO2e/kg carcass)	11.3	14.3	15.8	10.3	11.9	13.1	14.8

There are several factors which will affect production systems on farm due to labour demands and land type but, based on this research, a dairy bred animal will be more profitable for the farmer and have lower GHG emissions. Age at slaughter also has a major impact on GHG emissions.

Dietary supplementation to reduce methane emissions from Irish beef production.

Teagasc have been conducting research looking into the use of feed additives in beef production systems to reduce methane emissions.

Seaweed

Seaweeds have been a traditional part of animal nutrition for centuries. More recently, the tropical red seaweed*, Asparagopsis taxiformis,* has attracted attention following published reports published by CSIRO on the reductions in methane emissions of up to 80 per cent when small quantities of this seaweed are added to cattle and sheep diets. While the Irish climate is unsuited for the commercial production of *Asparagopsis taxiformis* researchers at Teagasc Grange are investigating the methane reducing capabilities of indigenous brown and green seaweeds. Over 30 seaweeds have being screened using the RUSITEC system, which simulates the rumen digestive process. The efficiency of a small number of seaweeds with apparent anti-methanogenic properties are currently being assessed in beef and sheep trials.

Synthetic Compounds

The synthetic compound 3-nitrooxypropanol (3-NOP) or Bovaer® (developed by DSM) has been widely researched in dairy and beef cattle with methane reductions of >30per cent observed. When consumed, Bovaer® is broken down into compounds that are already naturally present in the rumen, with its effect on methanogenesis immediate once ingested. It acts by inhibiting an enzyme which is required for the final step in methanogenesis and therefore stops the methane production process. However, the continued suppression of methane synthesis requires a constant supply of the compound in the rumen, with ruminal wash out of Bovaer® known to return emissions to near pre-supplementation levels. This feed additive has been evaluated internationally under high-input intensive production systems with fewer research studies on livestock fed high forage-based diets. In February 2022, the feed additive was approved for commercial use in the European dairy industry and was recently shown to reduce methane emissions by approximately 30 per cent in beef cattle offered a grass silage-based diet at Teagasc Grange. Following the results of the study and others, the product will hopefully soon be licenced in Europe for inclusion in beef cattle diets.

Synthetic compounds such as oxidising methane inhibitors developed by industry partners are also being evaluated at Grange. To date, these additives have been assessed using the RUSITEC system, yielding promising results. The most promising formulations of these inhibitors are currently being fed to sheep and beef cattle to assess their anti-methanogenic potential and effects on animal productivity. A major global challenge is the application of feed additives during grazing.

CHAPTER 8: HEALTH AND MEAT QUALITY SOLUTIONS

Health and quality are two key concerns of consumers and work has been done by a number of companies to address this.

8.1 Meat & Livestock Australia

Meat & Livestock Australia (MLA) has implemented several initiatives to improve beef quality in Australia, with the Meat Standards Australia (MSA) programme being at the forefront of these efforts. I met with Michael Lee to discuss the work that MSA are doing for beef production.

Meat Standards Australia (MSA) Programme

The MSA programme, established by MLA in 1999, is a world-leading meat grading system designed to improve the eating quality consistency of beef and lamb.

Consumer-focused approach: The system is based on over 700,000 consumer taste tests by more than 100,000 consumers from nine countries, considering all factors that affect the eating quality of 169 cuts and cooking combinations within a carcase.

Increased participation: 3.8 million cattle, representing 46 per cent of the national adult cattle slaughter were graded through MSA in 2019 this has since grown to 3.88 million cattle and over 50 per cent of cattle slaughtered in 2023.

Continuous improvement: The average MSA Index, which represents the eating quality of a compliant carcase and, in 2019, this was 58, the highest average ever achieved at the time. This has since improved further.

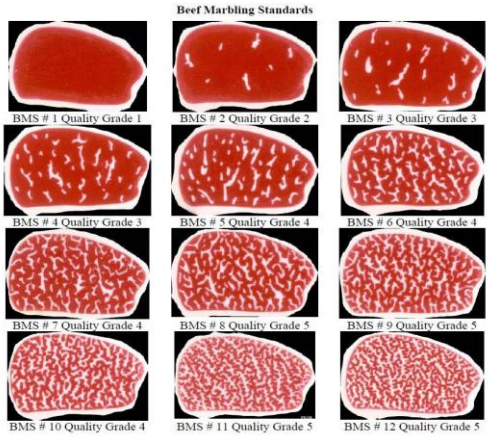

Figure 19: MSA beef marbling grid. https://www.mla.com.au/globalassets/mla-corporate/marketing-beef-and-lamb/documents/meat-standards-

The MSA programme has given both domestic and international consumers' confidence in the quality of Australian beef. This is vital to the Australian beef industry as 74 per cent of production is exported.

Meat Standards Australia Grading System

MSA-trained graders collect information from various sources, including cattle suppliers, abattoirs, and chillers. This data is crucial for assessing multiple factors that can affect the final eating quality of the beef.

Carcase Assessment

- Ultimate pH
- Marbling
- Fat coverage
- Carcase weight
- Maturity (ossification)
- Meat colour
- Fat colour
- Firmness

Consumer-Based Scoring

The MSA system is based on extensive consumer taste tests. To date, over 114,000 consumers across 11 countries have participated in MSA consumer testing, providing scores on the eating quality of over 800,000 beef samples.

Consumers evaluate the beef based on four key criteria:

- Tenderness
- Juiciness
- Flavour
- Overall liking

The MSA score is them calculated putting a value of 10% on juiciness and 30% on all other factors to give a score out of 100.

MSA Grading Scale

The MSA grading system uses a 1-5 scale to grade meat quality:

Grade 1: Poor

Grade 5: Exceptional

However, for consumer-facing labelling, MSA uses a 3–5-star system:

- 3 stars: Good everyday quality
- 4 stars: Better than everyday quality
- 5 stars: Premium quality

8.2 Devenish Nutrition

I listen to a presentation by Dr Alice Stanton, Director of Human Health at Devenish Nutrition. Dr Stanton, a professor at the Royal College of Surgeons in Ireland, has strongly criticised the EAT-Lancet report and its recommendations for reducing red meat consumption. Her response can be summarised in the following key points:

Nutritional Inadequacy

According to Dr Stanton, the EAT-Lancet report's recommended diet "would not meet nutritional requirements for adults". She points out that the dramatic reductions in animal-source foods advocated by many plant-based diets, including the EAT-Lancet diet, would worsen already prevalent micronutrient and protein deficiencies worldwide.

Misrepresentation of Red Meat's Health Impact

Dr Stanton challenges the report's claims that animal-source foods, particularly red meat, cause heart attacks, stroke, and cancers. She argues that the evidence for adverse outcomes from moderate consumption of animal-source foods "is weak and uncertain".

Bioavailability of Nutrients

Dr Stanton warns that plant-based diets with very low animal-source food content can worsen already prevalent micronutrient deficiencies particularly that of iron in females in western Europe. She points out that as the percentage of energy from animal-source foods in national food supplies decreases, the prevalence of micronutrient inadequacy increases exponentially.

One of Dr Stanton's key criticisms is that the EAT-Lancet report fails to recognise the lesser bioavailability of protein and key micronutrients from plant-source foods compared to animal-source foods. She emphasises that red and processed meats are rich sources of essential amino acids and commonly lacking micronutrients. Despite acknowledgments of errors by the EAT-Lancet authors, Dr Stanton notes that no corrections have been applied to the published papers, and the same estimates remain unchanged on their websites. This continued use of uncorrected data concerns her, as it continues to influence policymakers and researchers.

Call for Evidence-Based Approach

Dr Stanton urges scientists, policymakers, and all involved in the food system to be extremely wary of reports, guidelines, or global health estimates that are not rigorously and transparently evidence based. She advocates for a more balanced approach to dietary recommendations, recognising the nutritional benefits of moderate meat consumption as part of a healthy diet.

CHAPTER 9: MARKETING SOLUTIONS

9.1 Stemple Creek Ranch

Stemple Creek Ranch has experienced significant growth and transformation since Loren and Lisa Poncia took over the family business.

Figure 20: Stemple Creek Ranch, Sonoma, California. Photo: Author's own.

Business Growth

Financial Growth

The ranch has seen impressive financial growth, with annual sales increasing from $1 million in their first year to $8 million in 2022. This substantial increase demonstrates the success of their business model and the growing demand for their products.

Market Expansion

Stemple Creek Ranch has diversified its sales channels:

- They now sell at two farmers' markets.
- They ship directly to consumers, generating approximately $1.5 million in sales.
- The remaining $6.5 million comes from sales to grocery stores, restaurants, and butcher shops.

Product Diversification

The ranch has expanded its product offerings over the years:

- Started with grass-fed beef and lamb production 14 years ago.
- Added pastured pork and poultry production in the past five years.

Acreage Increase

- Initially operated on 600-800 acres.
- Now own about 1,000 acres.
- Lease approximately 5,000 additional acres.
- Purchased the Burbank Ranch, which is contiguous to the Poncia Family home ranch.

- Leased additional pastures in Shasta, Sonoma, and Humboldt Counties in Northern California.

Operational Growth

Employee Expansion

- Started with only Loren and Lisa as employees.
- Now employs 15 people.

Sustainable Practices

- Implemented regenerative agriculture practices.
- Collaborated with the Marin Carbon Project to enhance soil health.
- Fenced off Stemple Creek to protect it from overgrazing.

Figure 21: Loren Poncia, showing the benefits of herbs in his pasture. Photo: Author's own.

Environmental Impact

- The ranch now hosts 55 species of migratory birds.
- Their regenerative practices have led to increased carbon sequestration, removing more CO_2 from the atmosphere than conventional ranching methods.

Stemple Creek Ranch's growth is a testament to the Poncia's vision of combining heritage practices with modern sustainability and marketing strategies. Their success demonstrates that a focus on quality, sustainability, and direct-to-consumer sales can lead to significant business growth in the agricultural sector.

9.2 Cream Co. Meats

Cream Co. Meats is a unique and innovative company in the meat industry, based in Oakland, California. Founded in 2016 by Cliff Pollard, this whole-animal butchery and distributor is committed to reshaping the meat industry through sustainable and regenerative practices. Cream Co. Meats stands out as the only 100 per cent natural-or-better USDA meat processor and distributor in the Inner Bay Area. The company partners with over 25 sustainable and regenerative family farms and artisan producers, primarily from the West Coast and beyond.

I visited their facility in Fresno, California to discuss their business.

"We want to sell meat that makes you feel good."

Sustainability Focus: Cream Co. requires all partner farms to operate with "never-ever" practices or better, meaning animals are raised without pesticides or hormones, have access to open areas, and are entirely or partially grass-fed.

Whole Animal Utilisation: The company employs a whole animal approach, finding uses for all edible parts of the animal to minimise food waste. They create various products from meat trimmings, including ground beef, burger patties, and hot dogs.

Regional Sourcing Model: Cream Co. promotes a decentralised, regional meat market. This approach reduces food miles, supports local economies, and strengthens community ties.

Quality Assurance: All ranching partners undergo rigorous annual third-party auditing and carry multiple certifications, including Organic, Non-GMO, 100 per cent Grass-fed, Grass-fed & Grain-finished, Humane Certified, and Certified Regenerative.

Cream Co. Meats is actively working to create opportunities for small farms and ranches to support a more localised food system. By connecting independent producers to larger markets and distribution channels, they are helping to overcome barriers in the sustainable meat industry by partnering with various foodservice companies and institutions, including Shake Shack and Eataly. They are also bringing regeneratively raised meat to consumers who would not normally have access by supplying dozens of public-school systems and hospitals in California through the Beef2 Institute.

Figure 22: Beef dry aging in Cream CO's butchery in Fresno California. Photo: Author's own.

9.3 National Cattleman's Beef Association

The National Cattlemen's Beef Association (NCBA) is a prominent trade association and lobbying group representing U.S. cattle producers. Established in 1898, it aims to enhance the business environment for cattle farmers and ranchers, increase beef demand, and expand global access to U.S. beef products. With over 25,000 individual members and several industry organisations, NCBA collectively represents more than 175,000 cattle producers and feeders.

NCBA administers the Beef Checkoff programme, which funds beef promotion, research, and marketing activities through a mandatory assessment on cattle sales. This programme has been pivotal in financing initiatives that aim to boost beef consumption and improve industry standards. The organisation also advocates for policies that support cattlemen's interests, including environmental stewardship and humane animal treatment.

Despite its focus on promoting beef, NCBA has faced criticism for prioritising the interests of large meatpacking companies over independent ranchers. Critics argue that its lobbying efforts often undermine smaller producers and contribute to declining beef consumption rates. Overall, NCBA plays a crucial role in shaping the U.S. cattle industry's landscape while balancing the needs of its diverse membership base.

I met with Josh White, Sr. Executive Director - Producer Education & Sustainability and Samantha Werth, Senior Director of Sustainability to discuss their roles and the role of the organisation. I was also lucky enough to join a new start induction day to get a feel for the U.S. beef industry visiting ranchers, feedlots and universities. On the bus journey I was able to meet with NCBA members from all over the U.S. to discuss beef production in their area.

Figure 23: NCBA offices Denver Photo: Author's own.

The "Beef. It's What's For Dinner." campaign has been remarkably successful since its launch in 1992, becoming one of the most recognisable and enduring marketing efforts in the food industry. The campaign achieved widespread recognition, with over 88 per cent of Americans familiar with the slogan. It has become deeply ingrained in American culture, evolving from a mere tagline to a common phrase and cultural icon. The campaign's success is attributed to its declarative and resonant nature, appealing to a broad demographic range.

The campaign has significantly influenced beef consumption and sales:

- Online grocery platform Instacart saw beef sales increase by 26-36 per cent after consumers viewed campaign ads.
- On the food delivery platform Postmates, the campaign drove a two per cent increase in burger purchases.
- By 2019, the brand reached consumers over one billion times.
- 96 per cent of consumers reported eating beef, with over 70 per cent consuming it at least weekly.

The campaign's effectiveness has been recognised through multiple awards, including:

- Sappi Award in 2006
- Effie Awards in 2003, 2004, and 2007

Image https://www.beefboard.org/2020/07/30/beef-its-still-whats-for-dinner/

CHAPTER 10: DISCUSSION

Alternative proteins are not the threat that I perceived them to be in 2019 at the beginning of this study, however there are many other challenges facing the beef industry and effecting beef consumption. This is not to say that alternative proteins will not play a bigger part in people's diets in the future. The UK's Food Standards Agency (FSA) in March 2025 announced it is looking at how it can speed up the approval process for lab-grown foods. The FSA aims to complete a full safety assessment of two lab-grown foods within two years. As an industry we must not stick our heads in the sand nor have the attitude of 'we will produce it, and you will buy it'.

My travel has allowed me to meet progressive companies and producers who do not have that opinion; they are taking steps to understand the customer and their expectations for protein products in the future.

Animal welfare will always be an issue within livestock farming and from my travels it is something in which we can improve on greatly, not least on my own farm. We pride ourselves in the UK as having the best animal welfare and particularly compare ourselves against large scale American feedlots however, what I saw on the feedlots I visited was far from poor animal welfare. For example, if we look at the space allowance of the Kuner Feedlot of 48m^2 per animal whereas Red Tractor recommendations are for 3m^2 on slatted barns or 7.5m^2 on straw bedding.

Environmental concerns are a big issue regarding beef production, and I believe the industry needs to take some responsibility rather than saying we are not the problem. A good example is the communication attitude of Rowan McMonnies – 'this is what we believe we are doing well, and this is what we believe we can do better, and this is what we are going to do about it'. From my travels to the USA and Ireland I believe we have many opportunities to reduce our environmental footprint by improving efficiencies, adopting new technologies and some old ones in terms of grassland mixtures.

In terms of meat quality and nutrition, the UK is being left behind other countries, in particular the USA and Australia with their meat quality grading systems. A consumer can be guaranteed the eating quality of their beef if they buy 5-star MSA or Prime USDA cuts in the supermarket whereas it can be a lottery with British beef. This could become a bigger threat in the light of Brexit trade deals where we could see more imported products on the supermarket shelf.

Figure 24: Trader Joes Meat Counter. Photo: Author's own.

As an industry we are not doing a particularly good job at marketing our products or ourselves. When I compare the UK shelves to those of

Trader Joe's in California, our products do not look very 'sexy'. As individual farmers, we could look at marketing directly or forming producer groups like that of Cream Co to bring products directly to market and tell our story.

CHAPTER 11: CONCLUSIONS

My Nuffield study has been an amazing experience to meet passionate and knowledgeable people but also see beautiful parts of the world. One take home message has been:

"Why should we be afraid to lay it all out? If you are doing something on your farm you wouldn't want the public to see, why are you doing it?" Rowan McMonnies, Australian Eggs

If we are proud of what we do as beef producers, why would we not tell our story.

- The alternative protein industry faces as may challenges as the beef industry.
- Animal welfare in the UK is good but there is still room for improvement.
- There are many ways to reduce beef's impact on the environment.
- Technology exists to grade beef quality to ensure consumers get consistency in beef products.
- We can do more to communicate our story to consumers and market beef products.

CHAPTER 13: RECOMMENDATIONS

From my research and these conclusions, I have the following recommendations:

- Review animal welfare on farms across the UK and develop an improvement strategy. This should not only be done at a high level, but also by individual farm businesses, and this plan should be communicated in a CSR style report.
- Develop and implement an MSA/USDA meat grading system to consider UK consumer preferences.
- Implement and incentivise technologies on farm which will reduce GHG emissions and improve biodiversity.
- Can individual farm businesses or farm clusters look at developing direct to market systems?

CHAPTER 14: AFTER MY STUDY TOUR

I have started to think differently and have been experimenting with our farm. In 2023 we looked at outwintering to reduce the time animals spent in slatted barns to improve animal welfare; however, this happened to occur during the wettest winter on record, therefore outwintering may not always be the best option.

Also, we recently started a beef box enterprise on farm and are developing a brand to share our story with consumers.

I have spoken to several groups including business discussion groups and young farmer groups about my Nuffield experience and findings.

I was also a member of the organising committee for the 2024 Annual Nuffield Conference in Belfast which was very fulfilling.

CHAPTER 15 ACKNOWLEDGEMENT AND THANKS

I am indebted to both the Nuffield Farming Scholarship Trust and The Thomas Henry Foundation for this opportunity. It has allowed me to develop skills, learn about agriculture production and think deeply about what we do as farmers. This opportunity has developed me as a person and my business, and I hope to bring these findings back to improve beef production in the UK.

I would also like to thank the staff at the Nuffield Farming Scholarship Trust for their support over the last five years; my 2020 scholar cohort; fellow Northern Irish scholars; and my Nuffield mentor Trevor Alcorn, for their friendship and guidance. I appreciate my employer Fane Valley for allowing me the time to complete this scholarship and get involved in wider industry activities.

Importantly, I want to thank my family for their support over the years which enabled me to complete this scholarship, in particular my father David who kept the farm running in my absence.

Finally, I would like to thank all those who took the time to meet me, discuss my topic, show me their businesses, and welcome me into their homes as part of this study.

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