Meat Supply Chains and Climate Change

'Meat supply chains and how they may be affected by climate change'

How climate change will affect and influence meat supply chains - in particular those with a New Zealand producer and a European consumer – focussing on concepts such as food miles and green branding.

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A Report to the
New Zealand
Nuffield Farming
Scholarship Trust

Contents

Executive Summary

I found that **Global Influences** are resetting the rules. The economies of large newly developing countries (e.g. Brazil) are becoming very important influences on world agriculture. Global warming and biofuel are causing huge spin off effects in commodity prices

These factors influenced the final shape of my topic which became:
'Meat supply chains and how they may be affected by climate change'

I Focussed on:

- The **Farmer** end of the supply chain and also the **Consumer** particularly looking at the concept of 'green-branding'.
- The **UK** covering issues such as food-miles and carbon foot-printing.
- Wider **Europe** to give a perspective in markets beyond the UK.

I investigated Key Influencers in the UK including: farmers; retailers; government and regulatory authorities; lobby groups and experts; media; consumers.

I was particularly interested in the attitude and approach of **UK farmers** towards climate change. UK farmers are becoming more aware of the potential impact of climate change on their farm businesses. How they perceive climate change is influenced by where in the country they farm and which sector they are in. Some areas of England are concerned about the increased threat of drought and flood. With relatively intensive livestock systems awareness is increasing of potential requirements to reduce energy inputs and calculate carbon emissions. Farmers are investigating systems to produce energy from waste and byproducts. Arable farmers, in particular, see opportunities from climate change through growing crops for fuel not just for food. UK farmers have seen the emergence of the food miles concept as an opportunity to reinforce campaigns encouraging the consumption of British food.

At the other end of the chain I looked at retailers and consumer behaviour particularly related to green branding issues. I also looked at the influence that retailers, media, NGOs, food policy experts and government policy are having on consumer reaction to the issue of greenhouse gas emissions throughout the food chain.

Consumer Issues I investigated in the UK included: food miles; carbon footprints; local food; and livestock in the food chain as well as consumer concerns about food ethics. I identified that the British consumer links the 'food miles' concept with: climate change; sustainability; gourmet and local food and food patriotism. I concluded that, in the UK, New Zealand needs to promote the broader issues of sustainability and carbon footprints. It is important for New Zealand to communicate a positive message of its green credibility.

In other countries I found that:

- 'Food-miles' is mainly a UK concept
- 'Natural' and 'safe' are important concepts in many countries
- The approach to climate change varies hugely between countries
- Energy is a much more common focus than food
- There is considerable variation between cultures and countries in there approach to climate change as there are similarities – it is very easy to focus on the English-speaking countries.

My recommendations include:

Continuing to cultivate and enhance our 'natural' image in overseas markets. In the UK in particular this should include providing good quality information on carbon emissions from New Zealand agricultural products.

Increased emphasis on research and development in the area of climate change including a high degree of collaboration both on and off shore. This should include livestock GHG emissions and analysis of emissions throughout food chains that originate in New Zealand.

For carbon equivalent footprints we need industry examples and methodology particularly in the agricultural sector. Where are the easy things to change even if the gains are smaller? Are the differences between farm types and regions significant?

Small grants, pilot projects to get things happening in New Zealand that are everyday overseas in the energy and agriculture sector e.g. more use of by-products and waste.

Each part of the chain needs to understand its contribution and make changes. It may be easier to make larger gains in some areas than others – e.g. refrigeration techniques, but all parts of the chain including on farm need to look to what they can do in the short-term as well as the longer term where new technology and research may make a substantial contribution to solutions.

Introduction

"The only constant in life is change" *Francois de la Rochefoucauld*

Original Objectives

My original study topic was *"Production and the Environment – Opportunities and Threats"*.

My initial aims were to

- Get a wider understanding of farming around the world
- Learn more about the New Zealand's export markets

I planned to Focus on:

- Meat production and
- an environmental issue that will impact on NZ farmers

What did I achieve?

- I had an amazing experience
- Met inspiring people – often in the most unlikely places
- Changed my thinking and approach
- Formed opinions
- Learnt how much more there is to know

Itinerary

Heading off on my Nuffield scholarship in February 2007, what I wished to achieve from my tour was still a bit unclear. So the plan was to jump in the deep end by traveling with a group of Nuffield scholars looking at a range of farming systems and countries. Through this I hoped to get a wider understanding of farming around the world and crystallize my project topic.

The first five weeks of my trip away was as part of a Global Focus Tour with a group of mainly Australian scholars, but also including a Canadian and two New Zealanders. We spent a week in Canada where all the 2007 scholars (UK, Ireland, Canada, France, Australia and New Zealand) plus an American Eisenhower Fellow joined together to get know each other and get a snapshot of agriculture in Alberta (in the depths of winter).

Apart from Canada the tour spent time in California, Washington DC, Mexico, Brazil and France. Brazil was a particular highlight, but there were wonderful experiences and people in every country.

I spent time working on my Nuffield project in England, Scotland, Netherlands, France, Germany and Switzerland. On my way home I spent two weeks in Asia

visiting China, Japan and Korea. A total of 4 months away – and I feel I only scratched the surface of what I would love to learn about!

After the initial tour I was on my own. My original idea was to focus on meat supply chains and an environmental issue that will impact on NZ farmers. Firstly I wanted to increase my understanding of some key current and potential export markets for NZ meat. I also wanted to look at the factors that drive demand in these markets – in general, but in particular where these relate to farming practices.

General Observations

Common Themes and Issues
Visiting farmers and export markets from contrasting countries certainly highlighted both diversity and similarities.

I found some common themes and issues for farmers**:**

- Scale – whether to move to small niche or large corporate. There is less and less room in the middle ground.
- Labour– cost, shortages, immigrants, social issues
- Rising costs and low returns
- Increasing regulation
- Increasingly scare resources – particularly water
- Escalating emphasis on environmental issues – public pressure, international expectations, education
- Innovation by farmers to tackle problems
- Global changes – global warming, biofuel, developing countries are increasingly affecting all farmers e.g. through rising world grain prices.

Global Influences are resetting the rules

- Big economies along with rapid growth in some underdeveloped economies
- Global warming and biofuel are causing huge spin off effects in commodity prices

It was particularly fascinating for many of us on this tour to see a consistent issue coming through in our travel through the Americas. That was/is the effect of biofuel on agricultural systems and food supply chains. I started to become much more interested in some of the issues that traditionally are the ones that ‘make the eyes glaze over’ at farmers’ meetings.

Big Picture Issues
After the Global Focus Tour my appreciation of the big picture global issues affecting world agriculture increased hugely. A strong theme that came through in the Americas both North and South was the influence of biofuel. Government policies encouraging biofuel production are rapidly changing the face of agriculture around the world. This is seen in changing production patterns for grain, sugarcane and soybeans. Crops are produced for feed stocks for biofuel production, but also to replace the crops previously grown as livestock feed or directly for human consumption. Development in technology means that the cost of producing biofuel and the types of feed stocks or byproducts (often current waste products) used to

produce energy is evolving very rapidly. In Brazil we saw eucalypts planted five years ago in anticipation of development of technology to produce biofuel from cellulose.

As well as energy sources for biofuel we also saw examples of production of energy from waste products e.g. in the meat processing industry. This was usually on a large scale in North America, but I also, later, saw examples in Europe on a small local scale.

The other particularly interesting thing I found about the biofuel industry was not just how quickly it was happening, but also the spin off effects, not always expected. Removal of land from food production is quite quickly affecting food prices around the world. It is increasing costs for agricultural producers and forcing changes in production patterns and location of production. It is also creating many opportunities for farmers. A lot of these changes are happening at a global scale and are therefore affecting all farmers around the world, whether it is through shortages of production inputs or the need to change production systems to take new opportunities. Farming is a biological system that is affected by unpredictable weather patterns so rapid change to producing crops for fuel not food is creating a whole new dynamic for farmers. Farmers' management methods have traditionally been relatively conservative to manage the inherently high risk when they are dependent on climate and living organisms. The new dynamic appears to be favoring more entrepreneurial producers who are prepared to change and actively look for opportunities.

Food Cultures

I also found that I was fascinated with food cultures around the world.
A couple of examples:

Styles of meat

- Marbled steak, USA
- Wagyu beef, Japan
- Wet market, China (*daily produce markets with meat butchered on site)*

Cultural influences

- Absolute excellence in presentation, France
- Emphasis on food safety bordering on paranoia , Japan

During my time away I learnt a huge amount about our export markets while still feeling that I had only scratched the surface in terms of understanding the key drivers for importers, retailers and consumers in those markets. I wished frequently that I had a lot more foreign language expertise.

Observations from the Market

- Competition is fierce and NZ is a very small player
- Australia (and Brazil and US and …) are huge competition for NZ
- NZ exporters need to collaborate in markets
- And focus on getting 'NZ' on the radar
- Being seen to do the 'right thing' is important
- There are many new market opportunities – e.g. expats in China?

Topic Identification

My travel through the Americas and the emphasis we found on biofuel certainly influenced by project study, it led me to looking at a much bigger global issue than I would have previously considered. One that I had previously felt was too removed from my day to day business. That issue is climate change. However I didn't want to focus on just the biofuel aspect itself as I am neither an arable farmer or particularly mechanical or technical in my focus. Instead I am more interested in supply chains, what influences consumers, how farmers are reacting to climate change, and in particular, in meat supply chains as I am a meat producer.

So my initial working title became:
How climate change will affect and influence meat supply chains - in particular those with a New Zealand producer and a European consumer – focussing on concepts such as food miles and green branding.

The main focus of my study would be the UK as it is one of our most important markets, particularly for lamb, and there were already many media reports coming back on such issues as 'food miles' and 'carbon footprints'. I also wanted to look at other New Zealand meat markets and see how climate change was affecting farmers and consumers in those countries too. Was it the same or different?

Choice of Topic

I have found it difficult writing this report based on the 'project' part of my trip. The subject I chose was one that is topical and challenging to understand in its complexity. Climate change and meat marketing are also subjects for which our level of knowledge as farmers and member of the public has been very fast changing particularly in the last few months. Many of you will know now as much or more than I did at the end of my travels.

That is actually very exciting as I did feel when I was overseas that we needed to get up to speed pretty quickly. It is very encouraging how quickly we can become interested in subjects that used to 'glaze the eyes over'. I hope you will pick up something from this report and see it as a good source of resources and contacts that took me time to build up, but also a record of a journey that was well worth making and will encourage more from rural communities to take on those 'hard basket' international issues. The reality now is that we are a global community and despite air miles we need to keep learning more and more about the way the world thinks and how many differences in ideas there are as well as opportunities out there for us as individual New Zealanders and as an exporting country and a member of the international community.

The Nuffield Project

Introduction

Topic: 'Meat supply chains and how they may be affected by climate change'

Focus on:

- The **Farmer** end of the supply chain and also the **Consumer** particularly looking at the concept of 'green-branding'.
- The **UK** covering issues such as food-miles and carbon foot-printing.
- Wider **Europe** to give a perspective in markets beyond the UK.

Questions:

- How farmers and agricultural policymakers are reacting to climate change issues?
- How consumers and retailers are influenced at the top end of the supply chain?
- This last part is particularly relevant in the **UK** where green-branding and foodmiles, carbon footprint etc are big topics in the media and with retailers.
- Are the consumer/retailer perceptions in other countries similar to the UK?
- What does the concept of 'natural/green branding' mean to consumers in different countries?
- Who controls supply chains in different countries?
- In Western countries, buy local is also a concept being pushed along with organic. Do consumers differentiate?

Green Branding

Retailers in Europe (throughout the Western world), but particularly in the UK are positioning themselves as environmental issues become more important to shoppers. This is often called 'Green Point Labelling' or 'Green Branding'

According to the NZ Business Council for Sustainable Development companies in New Zealand (including internationally based firms) are actively selecting suppliers based on their social, environmental and ethical behaviour. The percentage of companies with proactive green policies is also increasing e.g. vehicle sourcing, waste reduction. This certainly reflects a global trend, particularly in the Western world.

Peter Neilson, CE NZ Business Council says "The Green wave, driven mainly by the need to avoid resource-use overshoot and manage the effects of climate change is no fad….The green 'fad' is permanent."

According to Saatchi and Saatchi UK, such a strong association between corporate action - and potentially inaction - on the environment and social irresponsibility leaves brands at risk unless proactive steps are taken to become green. Emerging green consumer purchase behavior suggests this scenario:

- Despite the real threat of global warming, consumers will continue to spend on the things that they want and enjoy
- Demand for green (or greener) products will increase over time as attitudes and social norms evolve, new product choices become available and information that enables consumers to make informed purchase decisions (e.g. green labels) is introduced
- Consumers will start to shift spending to greener brands *within a category*
- Consumers will increasingly prefer to purchase from companies with a brand that is perceived as green, regardless of whether or not the product that they ultimately purchase is one of the company's "green" products

"Brands will not be able to opt out of [being green]. Companies which do not live by a green protocol will be financially damaged because consumers will punish them. In the longer term, I do not think they will survive." *Lee Daley, chairman and CE of Saatchi & Saatchi UK*

The Carbon Trust predicts that by 2010, the UK consumer market will have reached a tipping point: Purchase decisions will take into account climate change impact and how companies are actively addressing it. Consumers will increasingly prefer to purchase from companies with a brand that is perceived as green, regardless of whether or not the product that they ultimately purchase is one of the company's "green" products.

Climate Change

"Climate change" is a phrase we use to describe changing climate patterns that:

- Can be attributed to human activity that alters the earth's atmosphere;
- Are beyond natural climate variations observed over comparable time periods.

Source MAF website

The effects of global warming and climate change are already measurable. New Zealand's climate is changing, largely because of the build-up in the earth's atmosphere of greenhouse gases – particularly carbon dioxide, methane and nitrous oxide.

NZ's global emissions are 0.2% of the world total, but per-person we rank 12th. Almost 50% of NZ's greenhouse gas emissions are made up of methane and nitrous oxide, the two gases most closely associated with farming.

Greenhouse Gases (GHGs)

- Carbon Dioxide is the standard Greenhouse Gas equivalent
- Nitrous Oxide (NO2) has 21x potency for CO2 equivalents
- Methane (CH4) is 296x potency for CO2 equivalents
- Refrigeration gases are 1000s of x more potent

Some Stats (2005):

- Agriculture earns $15billion total export value – 18% of GDP
- Agriculture makes up 52% of total merchandise exports from NZ
- Agriculture contributes 50% of New Zealand emissions

New Zealand's agricultural emissions (Greenhouse Gas Carbon Dioxide equivalents)

	1990	2004	% Change
N2O emissions	9958	12394	24.5
CH4 emissions	22159	24473	10.4
Total CO2 equiv. emissions	61614	74688	21.2
Agriculture as % of total emissions	52.1	49.4	

Source: PGgRc and AgRes

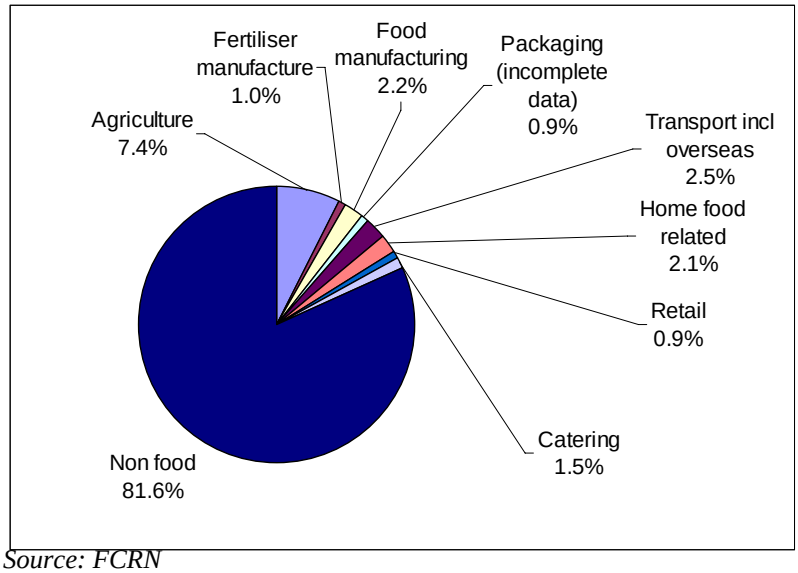
Our emissions are still increasing and were last reported at 76.7million tonnes in 2005 – a 2.8% annual increase.

By contrast in the **UK estimates of Greenhouse Gas production**:

Agriculture	7.4% of total
Food related emissions	18.4%

In the UK agriculture's contribution to GHG emissions is 0.7% of CO2, but 47% of methane and 67% of nitrous oxide (2003). *NFU climate change report*

Food consumption related contribution to UK consumption GHGs



Source: FCRN

The UK

Questions

- What are the issues for NZ farmers?
- How are UK farmers meeting the challenge of climate change?
- How is climate change affecting consumer decisions in the UK?

Key Influencers in the UK include:

- Farmers
- Retailers
- Government and regulatory authorities
- Lobby groups and experts
- Media
- Consumers *But are consumers influencers or followers?*

UK Farmers

UK farmers are becoming more aware of the potential impact of climate change on their farm businesses. How they perceive climate change is influenced by where in the country they farm and which sector they are in.

Arable farmers (who are the largest sector within England) see opportunities from climate change through growing crops for fuel not just food. Some areas of England are also particularly concerned about the increased threat of drought and flood. As many farming systems in the UK are relatively intensive more awareness is developing of potential requirements to reduce energy inputs and calculate carbon production. Farmers are paying more attention to systems found in other European (and American) countries which produce energy from waste and byproducts.

The livestock growing areas of England along with Scotland and Wales are more affected by the influence of ruminants on production of greenhouse gases. This is however a very small proportion of the total UK GHG production. In the UK (as for most countries) in general the focus in greenhouse gas production has been much more on energy. Where the UK differs from, say, Germany is in the development and dissemination of ideas linking increases in greenhouse gases with the food chain. There is a huge body of work, scientists, academics, government bodies and NGOs in England focusing on food related issues.

This energy/food focus has resulted in the UK on a great emphasis on carbon efficiency of distribution systems along with carbon accounting in general. This has tied in well with a strong move to retain tradition and countryside and an increasing (although elite) demand for ‘quality’ food.

From a UK producer/farmer point of view the resumption of beef exports to Europe after 10years (due to BSE) is seen as very important for British meat farmers. This has spurred a general increase in searching for opportunities in off-shore markets including for British lamb.

NFU – National Farmers Union

'The National Farmers Union (NFU) which is the British equivalent of NZ Federated Farmers put out a report on Agriculture and Climate Change in November 2005. The emphasis is on how UK farming will be affected by and will adapt to climate change. The NFU, particularly its arable section, sees potential opportunities for UK agriculture in renewable energy production. Key concerns for farmers are seen in the increased potential for diseases and increased threat of drought. However, especially in the south, farmers also see the opportunity to grow a larger range of crops. As agriculture is such a small contributor to the British GHG inventory it sees the idea of carbon foot printing is much less of a threat than in New Zealand. The livestock sector is also a much smaller portion of farming in the UK, particularly in England. Understanding of the potential implications of Nitrous Oxide and Methane emissions for farmers is just emerging.

- Why Farming Matters' campaign – this is a campaign to promote the value of British farming to the UK public. It has a positive message and appears to be reasonably successful.
- The NFU is unashamedly British in focus with such comments as "British shoppers are steering clear of produce with high food miles" – *Mintel*
- The NFU sees climate change as a potential opportunity for farmers e.g. "Can farming become carbon neutral?" *(policy advisor quote)* –using biomass energy technology as German farmers do.
- And another quote from the NFU "Worry about Nitrous Oxide and Methane later. Take the wins from carbon now."

Environmental Standards

The NFU is also keen to promote the linkage of increased environmental standards in UK agriculture under CAP with contributions to emissions reductions via measures such as improved soil structure and management to maintain organic matter which will lock up atmospheric carbon. It is also suggested that promotion of biodiversity measures can have an impact on increasing the soil sink effect for carbon storage and emission saving.

In the UK farmers are subject to a Climate Change Levy (CCL) which is a tax on the use of energy. Most of this is rebated subject to achieving agreed mandatory energy saving targets. Some of this levy goes towards funding The Carbon Trust [an organisation set up by the UK government to accelerate the UK's move to a low carbon economy by developing commercial low carbon technologies and work with business and the public sector to reduce carbon emissions]. More intensive agricultural producers in the UK such as pigs, and poultry have exceeded these targets.

Nitrous Oxide and Methane
"Agriculture is responsible for less than one percent of Britain's carbon dioxide emissions, but its contribution to total greenhouse gases is more significant – about 7 percent, due to nitrous oxide from soils and methane from ruminant livestock." *Jonathon Scurlock, NFU, Cereals 2007 conference*

Suggestions from the NFU and DEFRA (Department for the Environment, Food and Rural Affairs) for reduction of Nitrous Oxide emissions are focused on manure management techniques and enhancing efficiency of fertiliser use. The 2005 NFU report does acknowledge that "nitrous oxide is 200-300 times more effective as a greenhouse gas than carbon dioxide" and that this is a "key issue" as agriculture is the source of about 80-90% of European ammonia emissions. Ruminants contribute approximately 20% of UK methane emissions. This report acknowledges that "some of the methods suggested to reduce methane emissions may not be viable for UK agriculture, particularly as EU cattle are generally fed to their current nutritional optimum."

Opportunities
"It is calculated that an increase of 0.15% organic carbon in arable soils in a country like Italy would lock the same amount of carbon in soil as currently released into the atmosphere in one year by the use of fossil fuels." *European Climate Change Programme 2000*

Farmers and farmer organisations including the NFU see opportunities for British agriculture through biofuels and biomass production. To quote Peter Kendall, current NFU President "UK farmers have the capability and the will to help the government meet its biofuel targets and, in doing so, reduce CO2 emissions and make the development of a biofuel industry in this country a priority issue". The farming industry also sees opportunities to mitigate GHG emissions through the sequestration of carbon into soils and vegetation. The EU DG Environment [European Parliament Department of the Environment] calculates that 20% of the surface of agricultural land in the EU could be used as a sink. Measures suggested to achieve this include zero till systems; application of manure etc to arable rather than grassland; switching from traditional to energy crops e.g. willows hold more carbon on a more permanent basis; conversion of arable land to grassland, woodland or set-aside.

Local Food
The NFU has also seen the emergence of the food miles concept in relation to carbon foot-printing as an opportunity to promote British food production. For instance the reports states that "*Britain* is self-sufficient in over 70% of indigenous food, but this is under threat from imports. The NFU urges further recognition of UK food production's contribution to climate change sustainability."

NFU takes a neutral stance on food miles as its farmers export too, but it does support British food campaigns. The NFU also stays neutral on the organic v. conventional farming issue.

For livestock farmers and their organizations in the UK who are climbing out of the continuing blows of FMD and BSE, promotion of local food has great merit.

Consumers

Jonathon Scurlock, NFU advisor on biofuels and climate change in a speech to the Cereals 2007 conference also discusses how farmers can respond to consumer pressure for carbon foot printing of the supply chain.

"Some form of carbon labelling seems to be inevitable in the next few years, beginning with common shopping basket products like a loaf of breads or a kilo of chicken or beef. Like the major companies [supermarkets] – who are bringing this into the realm of their Corporate Social Responsibility statements – the NFU believes this is a further opportunity for farmers to demonstrate to the general public that we take environmental issues seriously, and that agriculture can deliver solutions to public problems."

"Like other climate change measures, carbon foot printing is likely to concentrate at first on carbon dioxide emissions alone – and that gives us in the NFU a unique opportunity to demonstrate how well we can do, before the more complex arguments about total greenhouse gases, including methane and N2O, become a part of the argument. But it is still unclear exactly how to draw up the boundaries around carbon foot printing."

"Every farmer in the country should aspire to becoming a net energy exporter. *This* will put us in a stronger position to defend modern agricultural production methods, which can reduce but never completely abolish our non-CO2 greenhouse gas emissions."

Scurlock proposes greater use of biomass heating, biogas digesters (as found in Germany) and growing energy crops. Many of these suggestions are based on the intensive farming systems found in the UK. In the UK heating buildings accounts for 40% of agricultural energy use.

He finishes his discussion with "Government and consumer pressure means that those who invest now will be rewarded – with stable energy costs and added value in a marketplace that will increasingly demand "climate-change friendly" quality products."

We could do well to in New Zealand to take heed of his comments particularly re the marketplace.

A Positive Image for Farmers

The NFU in Britain has developed since 2006 a strong "Why Farming Matters" campaign as a counter to farming reducing influence on national policy and promoting British farming in a more positive light to the general public. The campaign appears to be effective and certainly gets away from the 'whinging farmer' perception. It promotes policies of sustainability. It includes statements such as "Research in 2005 suggests that 70% of people in Britain want to be able to buy local

or regional foods and 49%want to buy more of them than they do now, partly because of growing concerns over food miles." And "Britain's dairy farmers take climate change seriously. Since 1990 greenhouse gas emissions have been cut by 15% and methane emissions, often negatively associated with livestock, have fallen by 13%."

Positive Approach to Climate Change from Farmers

Increasing organic matter levels in the soil is seen as an opportunity to build up carbon. From an NFU climate change adviser "Agriculture is the only industry that can store **more** carbon. Should we be financially rewarded?"

All countries signed up to the Kyoto Protocol have to calculate their Greenhouse Gas Account annually. In the UK, if Agricultural emissions (which don't include fertiliser) are added together with the categories of Land Use Change and Forestry, emissions have reduced by 22% since 1990 mainly due to Land Use change [CLA calculations]. Farmers in the UK see this as evidence of the contribution that agriculture can make.

The main biofuel products being looked at in the UK are bio ethanol from wheat in England and bio diesel from canola/rape or animal fats

Climate Change Mitigation

Allan Buckwell of the Country Landowners Association suggests that:

Agriculture offers several routes to help mitigate climate change.

1. sequestering carbon – in soil through appropriate management
   in woody biomass
2. enabling reduction in use of fossil fuels by providing alternative sources
3. material substitution i.e. swap wood for concrete, steel, bricks

Areas for British farmers to work on to reduce emissions:

1. soil management particularly fertiliser use and tillage reduction
2. breeding, feeding and housing livestock
3. Land use change
4. manure management
5. Research and development

The CLA suggests that the government should help with R&D as it is 'market failure'. The CLA would like to see the government encouraging offsetting schemes. Farmers can store carbon through the soil and trees. He reiterated that carbon gains must be verifiable, permanent and additional. The CLA are developing a Carbon Accounting for Land Managers (CALM) tool for farmers to calculate their GHG footprint. [This has just been released.] Alan Buckwell thought the food miles concept is a very poor base for policy. He said "there is no point farmers' taking responsibility for transport externalities. That should be transport people and supermarkets that solve. Measuring food miles is a complete nonsense."

NFU in the UK is cautious about the concept of farmers sequestering carbon in grassland. Some of the issues are timeframes for grassland continuing to sequester carbon and that it needs to be new grassland which means more opportunities for

arable farmers, but limited opportunities for livestock farmers who are also emitting methane and Nitrous Oxide.

The NFU is using fact sheets to promote climate change issues and information about methods for reduction in carbon/energy use and adaptation and mitigation possibilities. From DEFRA the next round of funding available for farmer advisor groups will be aimed at behaviour change building on its previous funding for awareness raising.

UK Retailers

A Mature Market
Britain's supermarket sector is much more competitive than in European countries such as France, where retailers are not allowed to sell below cost price, and the United States, whose vast size means that many market players, and the resulting competition, are regional. In such a mature market there is less room for growth, the major grocers are changing the way they sell goods; moving into non-food areas; and competing extremely fiercely. Price undercutting and loss leaders are important strategies used particularly by Tesco and Asda Group Ltd (owned by Wal-Mart). Price is particularly important in the larger UK cities where Tesco's have a 30% market share of the British food market compared to Asda at 17%.

Apart from the rounds of price-slashing, a lot of emphasis is on differentiation strategies by all the main British supermarkets including Marks and Spencer and Waitrose which are aimed more at the top-end of the food market. Brand strategies are increasing using an environmental emphasis with the term 'green branding' being coined. For supermarket businesses, positioning themselves positively in relation to highly topical and publicly debated issues such a climate change is seen as crucial.

The biggest names in British retailing and customer service are competing to be the greenest of them all, and the key issue they are tackling is climate change.

Sir Terry Leahy (Chairman of **Tesco**) made a speech at a joint Forum for the Future and Tesco event Jan 18 2007 on the implications of climate change. [See Appendix 1 for full text.]

He states that: "It (*climate change)* demands that we transform our business model so that the reduction of our carbon footprint becomes a central business driver."
and
"As a growing international business, we must set an example by measuring and reducing our greenhouse gas emissions. By setting targets that stretch our business. And by committing to do this in a public way, so we are transparent and fully accountable for what we achieve."

AND FROM

Sir Stuart Rose, chief executive of **Marks and Spencer** also in January 2007

"Every business and individual needs to do their bit to tackle the enormous challenges of climate change and waste." He pledged that: "M&S will change beyond recognition the way it operates over the next five years."

M&S's hundred-point plan to turn its operations green includes the bold move to become carbon neutral by 2012, using offsetting only as a last resort. It has also promised to clearly label the food it imports by air: and to make UK, regional and local food sourcing a priority. It plans to work with its suppliers to reduce their environmental footprint.

Stuart Rose states that "a responsible business can be a profitable business. We are calling this *'Plan A' because there is no 'Plan B'"*. This last slogan is highly visible throughout Marks and Spencer stores.

Marks and Spencers – 'Plan A'

- ***Plan A is our five-year, 100-point plan to tackle some of the biggest challenges facing our business and our world. It will see us working with our customers and our suppliers to combat climate change, reduce waste, safeguard natural resources, trade ethically and build a healthier nation.***
- We're doing this because it's what you want us to do. It's also the right thing to do. We're calling it Plan A because we believe it's now the only way to do business.
- There is no Plan B.

So what is motivating these changes? Some executives may be inspired by a desire to do the right thing on climate change. But it is also becoming ever more important for companies to be seen as green and doing their bit to tackle climate change. And the strongest pressure is on the companies that deal directly with the public and are in daily competition for their business e.g. supermarkets.

In the UK $1 in $7 is spent in a Tesco's store – they have immense power. It is a big brand, but they are vulnerable to consumer pressure as they are seen as a target by the media and NGOs.

What Tesco decides to do will be influential in the UK market just based on its market share. Tesco is modifying its distribution systems to reduce carbon emissions and promoting local producers. Promoting local is driven by consumers particularly where Tescos is becoming very large or moving into a new community.

Marks and Spencer and Waitrose are in a different, higher-end segment of the UK food market and promote their environmental and quality credentials extensively already. To maintain their position they need to continue to lift the bar. They can do

that through the assurance schemes that suppliers sign up to as suppliers - continuous improvement or continuous cost?

New Zealand needs to position itself to take advantage of these trends and to maintain and increase its place in the premium end of the market. Meat has a lot of substitutes so it is particularly vulnerable to consumer swings.

UK shoppers in general are still driven by convenience, but do like to select local foods too. Supermarkets are pragmatic and will provide some locally sourced foods where they can and particularly where it gains them high visibility amongst consumers.

Government Policy

The government in the UK has a heavy involvement in influencing both food retailers and manufacturers through its food policies. One of the most recent policy statements is the 'Food Industry Sustainability Strategy' (2007).

David Miliband, the former Secretary of State for Environment, Food and Rural Affairs sees the UK becoming 'leaders in green farming'. Farmers are being encouraged to make money from growing energy crops.

At the Oxford Farming Conference in January, 2007 in a speech titled 'Farming 2020' Miliband stated that farmers should "see climate change as an opportunity not (just) a threat. Global warming creates problems – but it will also create new markets and new opportunities."

He also stated that farmers should "differentiate your product and reconnect with consumers. The market in local, seasonal and organic produce is set to grow. The public sector can help. Consumer information and labelling is very important. But farmers have a key role themselves. Supply can create demand if it is explained properly."

DEFRA's (Department for Environment, Food and Rural Affairs) 'The Shopping Trolley Report' investigated the environmental impacts of different foods. These lifecycle analyses led to a government recommendation to buy locally produced food. UK Environment minister Ben Bradshaw said that "You could argue that the food industry is the biggest single contributor to climate change. In terms of our carbon and climate change imprint, it is probably the third easiest thing for individuals to make an impact on, after transport and housing choices – where we buy food, how we buy it and how we cook it." The UK government also published a 'Greener Food and Drink guide' which includes advice on buying from sustainable fish stocks, choosing food that is in season etc.

If the UK government wants change in the public's purchasing habits it has three main choices:

- Education to change habits and culture
- Restriction of access
- Increase price

Examples of these strategies can be seen with cigarettes and fast foods.
Some NGOs in the UK would like to see some of these strategies applied to meat for environmental and philosophical (animal welfare) reasons. 'Carbon' adds another pressure-point for these ideas.

NGOs and Experts

The UK has an extremely high level of experts working in the area of food policy and appears to be particularly strong in the debate on world food politics. The number of government and non-government organisations, academic bodies and individuals working in this area and contributing to public debate is still amazing to me. I am sure this is based on historic reasons, but it is also fed by a voracious media where the number two story after those celebrity based seems to be food based. During my time in the UK I found that working out who some of the more important organisations were and who they represented was a task in itself. Below is a small representation of these groups

Sustain – the alliance for better food and farming - is an 'advocate for food and agriculture policies and practices that enhance the health and welfare of people and animals, improve the working and living environment, promote equity and enrich society and culture'. Sustain has spearheaded the food miles campaign in the UK. In 1994 it (known then as the SAFE Alliance) launched the 'Food Miles Report'. This was followed in 1999 by 'Food miles – still on the road to ruin?' and in 2001 'Eating Oil – Food Supply in a Changing Climate'.

FCRN – the Food Chain Research Network - is a UK research council funded initiative that works to research and promote ways of achieving absolute reductions in greenhouse gas emissions from the whole UK food chain. Members of FCRN include research institutions, NGOs, the food industry and policy makers. FCRN focuses on research, reporting, networking and communication. It has a particularly useful online research library.

The Carbon Trust is an organisation set up by the UK government to accelerate the UK's move to a low carbon economy by developing commercial low carbon technologies and work with business and the public sector to reduce carbon emissions.

The Climate Group is an NGO dedicated to advancing business and government leadership on climate change. It operates in the UK, USA and Australia. It focuses on solutions and positive collaboration. Its approach uses communication, networking and partnerships. Members include a number of large corporations including supermarkets.

Academics and Researchers
Climate Change is generating a huge research effort globally. Amongst the researchers is David Viner at the Climatic Research Unit, University of East Anglia, Norwich. He believes that: "Climate change is not just an environmental issue it is a social and economic issue as well". He asks the question, along with other, whether the conflict between use of land for biofuel production versus food production is sustainable in the long term? To solve the dilemmas generated by climate change issues he believes lateral thinking is needed and that it is important not to discount the impact of small measures that may generate big results.

Others that are influential in debates that affect New Zealand Agriculture include: University of London Food and Agriculture Policy Unit and the Sustainable

Development Commission which is the UK Government's independent advisory body on sustainable development. It acts as a watchdog for government sustainable practice, but also reviewing the extent to which supermarkets deliver a sustainable food system in the UK.

There is great competition amongst individuals and organisations trying to occupy this new policy space. There are a lot of players and uncertainty about how to proceed in the undefined field of food and climate change. A variety of interests are seeking to move forward. This is driven by the growth of private governance in the UK (i.e. retailers and processors can set the conditions under which food reaches the table) which is due to a combination of innovation and a lenient regulatory environment.

Media

The volume of coverage in mainstream UK media on the subject of 'green branding' is staggering. While I was in the UK on any day you could select at least one mainstream daily and at least one magazine with prominent feature articles covering the green theme. The headlines covering climate change and related green concepts such as carbon footprints and food miles were constant.

At the UK Corporate Climate Response conference in June 2007 it was estimated that the volume of climate change stories in the UK media had increased by five times from a year earlier.

Campaigns

The UK 'Farmers Weekly' is one of the main farmer's newspapers in the UK. It ran in 2006 a campaign with the theme *'Local Food is Miles Better'*. This campaign has been supported by a number of other organisations. It has its own website – www.fwi.co.uk/gr/foodmiles. The site includes information on food miles, a petition, endorsements, competitions and a forum.

CLA, the Country Land and Business Association also promote local food with its *'Just Ask'* campaign encouraging the public to ask where the food on their plate comes from whenever they're out for a meal. CLA believes consumer pressure can drive a change in the amount of British Food we see on our plates. Currently 50-95% by category of British Food is imported.

'We're in this Together' is a new campaign in the UK designed to make it easier for individuals to do something about climate change. The companies involved in this campaign facilitated by The Climate Group include Marks and Spencer and Tesco. It targets consumers with everyday solutions to reducing their carbon emissions.

UK Consumers

"Consumers and citizens are the same person – what we ask at the weekend gradually changes to day to day" *David Hughes, Imperial College London*

For New Zealand lamb and beef in British supermarkets it is important to be aware of the increasing polarisation of the market in the British food sector towards at one end the budget market and at the other end the premium market. The range of choice of products in a food category and lack of knowledge by British consumers mean that they are looking to the retailer to help them make decisions. For instance, 'ready meals' provide a language to describe meat cuts for consumers who don't understand the technology.

Dr David Hughes of the Imperial College, London explains the characteristics that consumers look for in 'premium' products. These include: local; high touch; natural/unprocessed; slow food; seasonal; craft-scale; and closed supply chain. 'High touch' indicates products that are traditional, natural and unprocessed.

"*Clean and Green is a basic requirement, not a differentiation*" (David Hughes)
For instance LEAF (an assurance scheme with a strong environmental emphasis) is a basic requirement for Waitrose.

These are consumers that are looking for an experience and special times with friends and family. Particularly in mainland Europe these characteristics are often already perceived as belonging to NZ lamb, but in the UK particularly NZ lamb has been much more middle-of-the-road, or in recent times, a budget product.

According to EBLEX – the levy body responsible for promotion of English Lamb- important future trends for English beef and lamb consumption include political issues such as CAP reform and overall levels of livestock production; sustainability issues such as local/regional food chains and food 'awareness'; lifestyle issues of convenience and food cultures; technology in IT and marketing; and meat quality.

It is important to remember that the UK is our largest single meat market, taking 25% of our sheep meat exports. Retaining this market is therefore fundamental as is understanding the UK consumer and what influences them.

Section II: Major Issues

Food Miles

A DEFINITION
'Food Miles' is a relatively new concept concerned with the amount of energy consumed in the transportation of food, prior to its purchase by consumers - *Caroline Saunders*

'Food Miles' as a term was first used by Sustain (formerly the SAFE Alliance) in its 1994 Food Miles report – The Dangers of Long Distance Food Transport. It was defined as: *the distance in kilometres or miles that food travels from farm gate to consumer.*

Sustain has spearheaded the food miles campaign in the UK. This initial 1994 report was followed by two more reports in 1999 'Food miles – still on the road to ruin?' and in 2001 'Eating Oil – Food Supply in a Changing Climate' Recommendations for action in the 1999 report included: for individuals buying food locally (followed by nationally and the European region) - buy fair-trade; for food retailers - sourcing locally and also labelling according to Food Miles and country of origin; for government - requiring products to show country of origin information, distance imported, and the mode of transportation used. These recommendations were reiterated in the 2001 report.

Reports by DEFRA, FCRN (Food Chain Research Network), Chatham House and others highlight how much food supply systems have changed in the UK (and around the world) in the last 50years. Food culture and policy has moved from centrally driven and focussed on food security to systems that focus on commercial imperatives on one hand and individual choice on the other. The relative price of food has reduced hugely over the last half century. Globalisation of the food industry has led to large increases in the distance that food travels from producer to consumer and also supply chains are becoming more susceptible to the effects of a range of global influences. The Stern Review (2006) highlights the importance of 'the economics of risk and uncertainty' in the context of climate change. For instance, in the wheat sector some commentators believe that the combination of food, feed and bio-fuel production pressures could result in current exporting developed countries consuming all their wheat domestically.

Several studies (e.g. DEFRA Food Miles Report Issue 7, 2005) have attempted to quantify the impact of food miles. Amongst the DEFRA Report conclusions was "A single indicator based on total food kilometres is an inadequate indicator of sustainability." However it also highlighted the increasing contribution to CO2 emissions from transport of food by air. Air freight is only 1% of food tonne kilometres, but produces 11% of the food transport CO2 equivalent emissions. International sea transport is estimated to contribute 12% of CO2 emissions. It is

relatively efficient, but the volume of sea freight is rising. Currently emissions from air travel and shipping are not included in Kyoto targets.

Figure E1. UK food vehicle-kilometres by transport mode (2002)

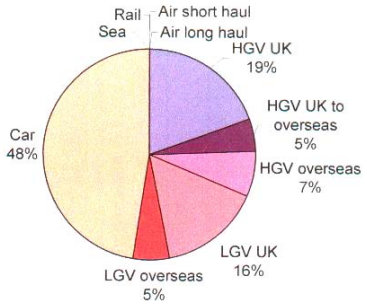
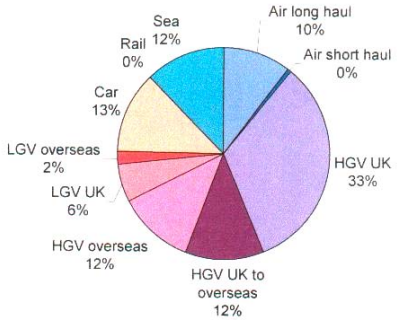


Figure E2. CO_2 emissions associated with UK food transport (2002)



Source DEFRA Food Miles Report

Food production and consumption activities account for 13% of the UK's CO2 emissions. Food miles make up no more than a quarter of the total. Currently the UK GHG inventory does not include international aviation and marine shipping. There is strong pressure to change this as it affects considerably the choice of strategies to reduce GHG emissions

In the UK in many consumers minds distance travelled = food miles = carbon emissions. Of course, this is not necessarily correct at all, but it is understandable how such an easy association persists especially when the media and NGOs are constantly reinforcing it.

Carbon Footprint

"It is the desire of modern society to value goods according to the Green Economy" This can only be achieved through measuring carbon and will create a 'Carbon Economy'." Alistair Dickie Director Crop Marketing HGGA

Supermarkets don't have an opinion, but they are the conduit of messages. Individual producers, food processors, and retailers want to protect their brand. If carbon footprint becomes a key brand value they don't want to be left behind.

This is leading to rapid development of concepts such as 'carbon foot printing' for individuals, products and businesses. The Carbon Trust defines a carbon footprint as 'the total set of greenhouse gas emissions caused directly and indirectly by an [individual, event, organisation, product] expressed as CO2equivalents'.

They state that 'the full footprint of an organisation encompasses a wide range of emissions sources, from direct use of fuels to indirect impacts such as employee travel or emissions from other organisations within the supply chain'. The Carbon Trust has published a guide for organisations wishing to calculate their Carbon footprint and

suggestions from how to reduce emissions. They classify emissions in three main categories – direct, from electricity usage and indirect. They acknowledge that calculating a footprint is complex and that lack of consistency currently in calculation methods can mean footprints are difficult to compare.

'Carbon Labelling' is labelling retail products with the [relative] amount of carbon embodied in the product. There are two components to carbon labelling – how the information is displayed and how it is analysed. Development of methodology to back up these concepts is being driven by such organisations as the Carbon Trust and the UK Sustainability Commission. Key questions to be answered to determine the aim and method for carbon labelling include which gases to include, which methodology, which stages and when. A key dependence is on the quality of the data available to make these calculations.

Local Food

The organic versus local debate has become one of the liveliest in the food world.

In the UK the University of Manchester, DEFRA commissioned *Shopping Trolley Report* stated that "There is no clear-cut answer as to whether purchasing an organic or a conventional trolley of goods has more or less impact environmentally". Neither, said the researchers, was buying locally produced food a guarantee of being environmentally friendly when considering the transportation system, particularly bulk haulage. They suggested that the best thing consumers could do to reduce the carbon footprint of food production and consumption was to leave their cars at home and walk or get public transport to the supermarket. They also stated that "the environmental impact of aviation is important for air-freighted products but such products are a very small proportion of food consumed". Professor Ken Green, who led the study, said: 'If you are concerned about the carbon footprint of foods, there can be a good case for importing some of them even if they can be grown in the UK. The evidence available so far shows that local is not always the best option for the environment".

For Scottish meat 'local' is still much more important than 'green branding'. Scottish meat has a premium throughout much of the UK. In Scotland the environment is less important as a brand value than in England. However for both markets food safety and animal welfare are the more important attributes for maintaining brand integrity.

From EBLEX (the English Beef and Lamb Executive): " Food miles could be included with the idea of regional branding." They find that pressure groups in England are always thinking of their next campaign – that's what keeps them employed.

Premium ranges in supermarkets have value beyond sales returns which may be low. These ranges which include 'local' and 'gourmet' type ranges promote a message about the brand value of the retailer that it stocks quality products.

In fact there are huge disadvantages for supermarkets if sales of local products increase significantly. Sourcing local products fragments supply. The cost advantage

of modern supermarkets is mainly through efficient bulk sourcing and distribution systems. Modern food shopping is based on one stop shopping emphasising convenience and price. Carbon foot printing is potentially a huge threat to this model based on efficient logistics. Climate change and its spin off effects could result in significant changes for the big retail chains as the cost drivers for the distribution systems change and potentially, regulatory controls are introduced.

Livestock in the Food Chain

The FAO report – *Livestock's Long Shadow, 2006* – identifies the improved management of methane and nitrogen output as a potentially major means of avoiding the worst impacts of climate change. This report encourages a move towards emissions based economies and accounting for greenhouse gases generated through food production.

Amongst some of the NGOs working in the food policy area there is a view that reduction of consumption of livestock products would contribute to a reduction in GHGs. When calculating a carbon footprint for an individual, level of meat consumption is a key contributor to the calculation

According to FCRN – the Food Chain Research Network - the UK's consumption of meat and dairy products accounts for 8% of UK consumption related greenhouse gases (including imports), largely due to significant emissions of methane and nitrous oxide. European studies find that meat and dairy products contribute about half the food GHG burden, while the FAO report puts livestock related GHGs as high as 18% of the total.

A recent report by FCRN comments that if livestock were not reared greenhouse gases would still be emitted by production of substitutes. The author calls for investigation into encouraging the British public to reduce substantially their consumption of meat and dairy products. However, it does also comment that 'if farming is to survive' consumers may need to pay more for livestock products. WWF has also made calls for reduction in dairy and meat products.

Discussion on Consumer concerns

Now in the 21st century some new global drivers are emerging and personal choice and low costs are tempered by ethical concerns including carbon footprints and the effects of purchase decisions on developing countries that rely on agricultural exports.

Apart from the drivers of food miles, carbon foot printing and local food there are other incentives for supermarkets to be seen to be actively contributing to reduction of greenhouse gas emissions. The so-called 'halo' effect is very important for brand value and PR in the UK supermarket sector which is so competitive, influential and such a target for the UK media. 'green' branding and 'carbon footprint' type campaigns by the supermarket chains can have a significant payback with brand

identity and also reduce the flak they receive from government and NGOs. As yet it is not energy cost that is the driver, but rather corporate social responsibility.

NGOs in particular are concerned about the conundrum of promoting local food when such a large percentage of imported produce is from developing African countries which are largely dependent on agricultural and horticultural exports. For example, the top four non EU countries air freighting fruit and vegetables to the UK are African.

Several case studies and reports have demonstrated that it can be more sustainable (in energy efficiency terms) to import food because of variations in production systems and climate. However, this argument is often lost in the overwhelming feel-good factor in 'buy local' and the simplicity of the 'food miles' concept.

For instance in the DEFRA Food Miles Report – "The term 'food miles' has come to signify more than the transport of food and the direct physical impacts of this transport. A number of other economic and social issues are bound up in the food miles debate. Firstly, issues surrounding the international trade of food are part of the debate on globalisation. It is clear that transport and trade of food has the potential to lead to economic and social benefits, for example through economic gains for both developed and developing nations, reduced prices for consumers and increased consumer choice. …Secondly, …food miles are often discussed in the context of decreasing farm gate prices, disappearance of local shops and detrimental effect on rural economies."

The British consumer links the 'food miles' concept with: climate change; sustainability; gourmet/foodie; food patriotism; farmer campaigns for local food. Celebrity endorsement for the concept of food miles has been powerful as is the influence of the NGOs who are passionate believers. The UK in particular London has a very large media community, science community and policy community. The London Mayor even advocated eating less meat for environmental/climate change reasons.

It is important for New Zealand to get a positive message out about its green credibility. One way it can do that is using eminent people that can act as advocates. Another is using modern techniques such as viral marketing for an example see *www*.marketinggreen.wordpress.com.

New Zealand needs to promote the broader issues of sustainability and carbon footprints to counter the simplistic 'distance equals food miles' concept. The New Zealand Clean, Green image needs to continue to be consistent and we need to promote our best practice and worry less about the not so good practice.

Section III: Wider Europe

European Policy and Issues

New Zealand is a signatory of the Kyoto Protocol which aims to reduce global GHG emissions by 5% over the first commitment period, 2008-2012. The European Community is aiming to reduce emissions by 20% and the Stern Review warns that a reduction of 60% is needed to make a difference.

The EU is now less protectionist and is more about public perception and politics (2Ps).
Hot environmental topics in the EU:

1. climate change
2. biodiversity
3. biofuels
4. water use and quality

The European government makes use of scientific advisory panels on policy for agriculture and the environment. The current EU commissioner for the environment has two priorities – biodiversity and climate change

In Europe government driven environmental trade barriers to do with climate change are emerging. This was illustrated last year when France approached the EU to put a tariff on imports from countries that don't have a price on carbon.

On climate change the EU Government sees main areas to concentrate on are: transport – by pushing car manufacturers to reduce emissions; and energy – by coming much more efficient in energy use. EU officials also see reducing emissions in agriculture as important, but if the EU imports food form elsewhere they may negate this. Similarly for biofuels spin off effects can occur e.g. reduction in forest or permanent pasture so that biofuel crops can be grown could negate the positive effects. The EU doesn't want to see efforts to combat climate change creating food poverty through conversion of land use to biofuel crops.

In the EU the emphasis now for tackling climate change issues is mitigation and adaptation. Farmers are putting their case that agriculture can play a part in this by: reducing feedstock for biofuel and biogas; making carbon sequestration opportunities available (tree-planting, set-aside) or converting set-aside to biofuel production; and promoting local produce (food miles). Farmers at this stage seeing the opportunities and threats are perceived to be more to do with drought, disease and flooding. There has been little attention paid as yet in the EU to methane or nitrous oxide yet. Ammonia (NH4) has had some attention, but more to do with air pollution. There is some focus beginning on nutrient budgeting to reduce nitrogen pollution of waterways

European Consumers

Important consumer issues for wider Europe are energy and environmental sustainability. The most important factors for buying decisions remain the 3Ps of

1. Price point
2. Presentation
3. Performance

Important markets for New Zealand meat in Europe have some key differences. There is a lot of cross-border trade within the EU so sometimes it can be hard to determine the final point of sale for products.

Importance of food attributes varies considerably between European countries. For the French important attributes include ‘local’ food; beautiful presentation; quality (e.g. taste and tenderness). The Germans on the other hand are very focused on price with all goods including food. Food and drink are strongly associated with socialising, but the quality of the food appears less important than in France. However Western Europe has a large and growing segment of the population in the well-heeled baby-boomer category that is much more prepared to indulge.

Generally, in Europe, animal welfare is the predominant consumer issue for food products derived from livestock. In mainland Europe environmental issues to do with farming are mainly perceived as being to do with waste and water.

The food miles issue has a high level of exposure in the UK, but has also had some coverage in other parts of Europe. With all ‘green’ issues consumer perception is all important i.e. being seen to do the ‘right thing’. It is important to tackle issues such as food-miles, but it must be seen as credible by the consumer.

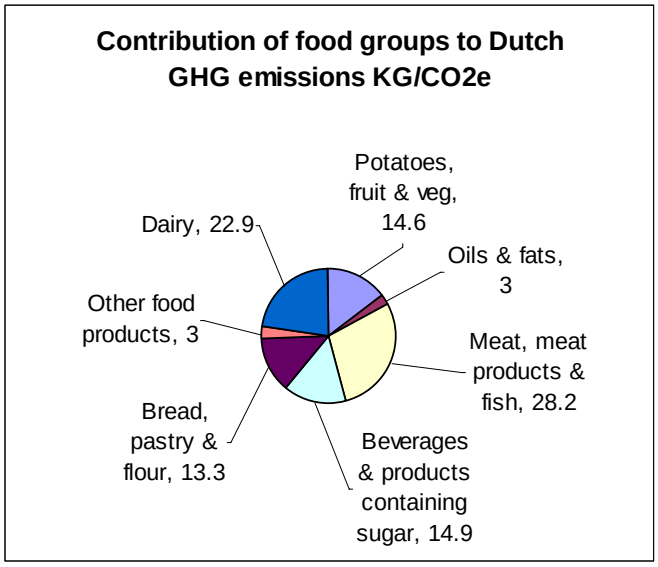
Food miles are seen as a side topic in the European Parliament scene, but there have been some initiatives on food miles however the trade and environmental/agricultural wings of the EU have differing views on the merit of any proposals.

Many countries in Europe are very rules based. Concepts and ideals are not always followed up by actions. The adherence to these ‘rules’ varies from country to country. The individual’s right to choose is also a strong value and is seen in examples such as, in France the strong pro-smoking lobby and in the Netherlands where the majority of the thousands of cyclists don’t wear helmets.

Netherlands

The general public in the Netherlands is less worried about the countryside than in the UK. Dutch meat consumers are influenced more by animal welfare issues than other environmental issues such as nitrogen pollution and climate change. Consumer experts in the Netherlands see food safety as an ongoing underlying theme, but the new trend is 'taste'

Climate change is however a very important issue in the Netherlands, but the big concerns are the threat of flooding and for the consumer fuel price increases.



Source FCRN website

Germany

Germans generally have a very positive impression of New Zealand. This extends to NZ agriculture and produce. A relatively common comment is "New Zealand lamb is organic anyway". For many Germans New Zealand products are seen as natural and virtually organic. Organic food is very popular with segments of the market more attuned to 'green' values. Animal welfare is a very important concern for German consumers so for many this may be the main driver towards organic as well as environmental concerns.

Germany is the third biggest importer of food worldwide and the fourth biggest exporter in the EU. Germans are used to a large percentage of their food being imported. However they are also supportive of local, traditional food. An important portion of consumers is conscious of were this food comes from and the conditions under which it is produced e.g. fair trade sales are increasing. Many consumers particularly in the higher end of the market are keen to be 'good' consumers. This is leading to a more general trend towards 'green' branding. Consumers in Germany as elsewhere are finding being a good consumer very complex e.g. organic v. where it is

from – fair trade, food miles, regional or imported etc. European consumers also want easy decisions. New Zealand's big advantage in this market is its clean, green image.

Traditional foods are still popular, but food purchases are significantly affected by price. Everyday food is often seen as fuel. There are also significant regional differences in Germany both in farming and in consumption. The south is much more traditional with smaller farms and of course there are still significant differences remaining from the former East and West Germany.

Climate change has been seen as a big issue in Germany for quite a while. The environmental movement is strong in Germany, but also the German economy is historically based around energy and industry. The economy in Germany has struggled over the last decade, but has picked up significantly recently. The issue of climate change is taken very seriously in Germany. The current German Chancellor, Angela Merkel, is also currently EU President. She has also been a key proponent of strong climate change strategies in Europe. She has had a clear focus on making significant progress in setting goals and direction for an EU and worldwide climate change policy.

Germany is focused on energy to tackle greenhouse gas emissions, in particular through reduction of emissions from vehicles, industry and power generation. Much of Germany's power generation is based on coal and there is a strong move in Germany to move away from the use of nuclear power.

Germans eat 90kg/person/year of meat. Less than 1kg of this is lamb. The majority is pork. Per head consumption of meat has reduced by 10kg in the last 15yr. Beef has been particularly affected. Germany is not a net exporter or importer of meat with production approximately equalling consumption, but it there is still considerable meat trade particularly within Europe, but also internationally particularly imports from countries such as Brazil. For lamb however, approximately 50% is imported. Much of local sheep meat production is sold directly to ethnic immigrants. New Zealand is the main exporter of lamb to Germany. Lamb is generally at a price point close to beef fillet.

Venison is commonly obtained directly from farmers or a local shop. Consumption of venison is very seasonal in the autumn (late in the year) and at Christmas.
The percentage of organic meat sold is still low and the price difference is still very high. However the vote for the Green Party is very high in Germany and it puts pressure on government and retailers to offer only the correct food. The percentage of vegetarians in Germany is high mainly due to concern for animal welfare. There is a high level of regulation related to animal welfare in Germany.

It is still vital to remember though that despite all the green 'noise' in Germany PRICE IS KING. Particularly in Germany consumers will say at the door that they will buy on the basis of food safety, animal welfare and the environment, but the purchases they actually leave with are on the basis of price.

There is currently a low level of awareness of the concept of 'food miles' in Germany. It is hard to tell whether this is due to its historic status as a strong trading nation (as with many other European countries), or its focus on price for food, or language. It is

interesting how little crossover there is between media for different European countries. Newspapers are quite country specific and it is quite difficult to get European news in English for instance that is not published in London. The slant of news items in the mainland European newspapers towards environmental issues appears quite different to that found in the English newspapers. [based on my schoolgirl French and some English translated European news which is mostly monthly].

Several sources said to me that the 'clean green image' for New Zealand is very strong. This impression was also backed up in France and other Western European countries. It was also emphasised that this image is very important to maintain and in the future we will need to back the picture up with information as to why NZ farming is efficient and sustainable.

France

France is a growing market for New Zealand Lamb and Venison. Sheep farming is very small scale in France and lamb is not thought of as an everyday protein. French farmers are an interesting mix of traditional e.g. in sheep farming practices and modern e.g. the latest combine harvester and large scale arable production. Many farmers have quite diverse income streams and the farm business is still generally a family affair. Obtaining land is very difficult for young aspiring farmers as the system of land purchase is not based just on price. There is a strong tradition of co-operatives which is not found in all European countries.

The culture of food is very strong in France. Meals are beautifully prepared and presented and particularly evening meals are eaten very slowly and savoured. Food is to be respected and valued and has strong social connotations.

Important food attributes for the French are local, beautiful presentation, quality (e.g. taste and tenderness). Quality is often associated with 'natural' values i.e. home-grown, low chemical use etc. 'Natural' values appear to work well for New Zealand products, including meat, in France.

The French are very parochial about food and place huge value on where food comes from. France is perhaps the home of the 'local food' concept. Price premiums will continue to be paid for French food over imported products.

Climate change does not have strong associations with food in France. By far the most emphasis is on energy. For the French expanding their use of nuclear power is seen as one of the most effective ways to reduce GHG emissions. It is also important to remember that the French are very protectionist whether it is protecting their important farmers lobby (due to the voting system) or their right to use nuclear power.

Section IV: Asia

My brief visit to Asia included the main cities of China – Beijing and Shanghai as well as Japan and Korea. It was enough however to highlight the huge opportunities and challenges of marketing New Zealand products to Asia.

Even by visiting three countries in Asia I found the differences in cultures striking. They are certainly very different markets with quite distinct consumer preferences. It highlighted for me the importance of differentiating between Asian markets.

China

In China the sheer volume and quantity of people, consumer goods, pollution and rapid change is hard to assimilate. The contrasts between traditional ways of life and the new is seen in food with the very busy food markets every morning with a big range of fresh produce and meat butchered on the spot. On the other hand there are a range of very modern supermarkets with several catering to quite distinct consumer segments such as European expats, Japanese and top of the range or more middle-class Chinese.

For many expats (and Chinese) food safety is a big issue with some serious concerns about the quality of food. This includes concerns about cleanliness in processing, the effectiveness of the cold chain and chemical use in production. Many expats in particular like to purchase food from non-Chinese sources whether that is produced in China or imported. This appears to be a particular concern with dairy products.

There is also amongst up and coming Chinese a significant demand for luxury, 'label' goods and services that are seen as status symbols these include whisky, watches and horse-riding. There was some very odd (to me) juxtaposition of products from the old and the new worlds of China.

There are huge opportunities in China, but obviously huge difficulties too. One is, knowing just where to start. New Zealand currently seems to have a very small presence in the market, but their appeared to be significant opportunities to be gained by concentrating on the 'New Zealand' brand and in such a large market by targeting very specific segments e.g. expats.

South Korea

"Hurry, hurry" was the catchphrase in Korea. It seemed very apt as Korea appears to have hurried into becoming a very modern state.

Competition is fierce in the Korean beef market with America lobbying hard for full access again after BSE scares. The Americans are certainly prepared to throw significant dollars at marketing to regain market-share. A visit to a food fair in Busan illustrated this with a very prominent American stand giving away lots of barbecued beef. Australia is also very active in the Korean market. Grass fed versus grain fed is

important for meat in Korea. Consumers are very strong on consumption of food and health type products such as teas made from all sorts of plants that are to enhance their well-being. Product attributes that are important for food include health and naturalness.

Japan

Japan is the home of food safety. The Japanese take food safety and presentation to extremes. Despite the incredible level of technology that can be found in Japan, tradition has a strong influence on day to day living in Japan. This is certainly true with food too.

The competition from Australian and American beef is incredibly strong in Japan too. The perceived superior qualities of grain fed beef, particularly Wagyu are highly valued. Grass fed New Zealand beef is promoted for its natural values. New Zealand has a relatively strong brand image in Japan, but is known more for products such as kiwifruit than meat.

Asia – Market Opportunities and Climate Change

My brief visit to Asia highlighted the market opportunities and the challenges in this part of the world. The competition is fierce, but the attributes of New Zealand products give it many advantages. In the more developed economies of Asia the ‘natural’ attributes of New Zealand produce fit very well with key consumer concerns and desires. China also provides an opportunity if marketing is focussed on the segments of the population that will value safety and uniqueness.

Concern about climate change is much less apparent than in Europe. In Japan and Korea concern about the environmental credentials of food was more to do with food safety (particularly in Japan) and personal wellness. Food from more natural sources is seen to be more health giving. In such populous countries less intensive production methods are perceived to be more natural and safe. The industrial base of these countries means that any focus on GHG emissions is in that area. The general populace doesn’t connect food with climate change issues.

In China the environment is pretty low down the priority list. Priorities related to climate change are centred on reducing pollution sources contributing directly to air quality. There are many obvious cases of serious environmental pollution and degradation of soil and water that are seem much higher priorities than worrying about attributes of food related to carbon. Food safety is also a serious concern related to the poor agricultural practice prevalent.

‘Green branding’ in Asia will increase in importance, but the emphasis will be on attributes associated with naturalness, well-being and food safety.

Conclusions

> "The Chinese word for crisis combines two symbols – one for risk and one for opportunity" *Peter Neilson CE NZ Business Council*

Climate change is reality whether we like it or not. Whatever the reality or otherwise it is driving huge changes in agricultural markets and production patterns around the world. These will impact on New Zealand farming even if the climatic effects are less than predicted.

There will be continued pressure for changes in farming practices and costs imposed to account for GHG emissions on farm. This is ultimately a consumer cost, but generally emissions will be targeted through sectors e.g. transport, energy, retail, agriculture.

There are significant efficiencies possible throughout supply chains that can reduce GHG emissions and bring cost savings. As agricultural producers at the beginning of the chain we need to push for change and back it up with the capital if need be – the days of cheap energy (and labour) are long gone. An example could be a pilot plant to use waste/byproducts to produce energy at the meat works – this is not leading edge, but common practice overseas. Surely this kind of project would be a great opportunity for seed funding for a pilot plant.

There are many measures we can implement throughout the meat supply chains to reduce energy use and greenhouse gas emissions that are easier than changing ruminant biology. We need to get focussed on these. We also need pro-active government industry policies which make it easy for these things to happen. For instance, once local government provides individuals with recycle bins they start to recycle – before it was too hard.

There are great opportunities to lead the world in the areas where we are unique in agriculture e.g. ruminant biology. Let's make sure we are leaders. We can influence global policy and methods for measuring carbon footprints – we need to do so.

Increasing the level of co-operation with overseas researchers and technology experts may help us directly to solve problems, but will also help us to be seen to be 'leading' not following in the area of climate change research in agriculture.

There are huge opportunities in new and current markets. We need the committed people on the ground in those markets and the budgets behind them – we are just tiny. How can we do that? - Ingenuity, collaboration with other New Zealanders, other meat marketers. There are many other forms of protein to consume and it is only going to all get more expensive. We need to embrace new forms of marketing – not expensive, but clever e.g. the expat community, viral marketing.

The 'soft' issues e.g. environment, animal welfare are only going to become more important to consumers. We need to face up to them and become proactive.

‘Food miles’ could be seen an opportunity if we wish to make it one. New Zealand agriculture needs to position itself. In the markets there is a general realisation about the complicated nature of carbon accounting. The UK markets and media are looking for information – we need to give them good quality information and good stories to state our case.

As the concept of ‘carbon-labelling’ is developed in the UK, New Zealand needs to continue to monitor and make our case. This includes promotion of a wider lifecycle approach to labelling related to GHGs not just focussing on transport. We can back that up through New Zealand and overseas research. There is a high level of expertise and research capacity on distribution systems in Europe in countries such as the Netherlands and Germany which we can build on.

In wider Europe, New Zealand needs to continue to monitor the food miles and carbon labelling issues. However, it does not appear to be obtaining significant traction. It is, though, a reminder to continue to promote and protect our ‘natural’ image in these markets. As well, it is important to expand our resource of verifiable facts and research on where New Zealand products will be placed when broader style eco-labels are put in place e.g. the new ecolabel being developed by the French supermarket chain Casino which looks at the whole lifecycle of a product.

New Zealand needs to remain well informed about gains in understanding about greenhouse emissions related to air travel. Globally concern is increasing about the contribution of air travel and shipping to global greenhouse gas emissions. This must be significant for us whether it is in tourism, trade, agriculture or for individuals. The spin-off effects by association with our distance from the rest of the world appear at first glance to be significant even if as is seen in the food miles debate there is more to it than the apparently obvious.

‘Hands off government’ is great, but sometimes industries and markets need a kick-start e.g. small grants, pilot projects to get things happening in New Zealand that are everyday overseas.

We are too complacent and comfortable; we need to get acting if we want to be seen to be pro-active. We can start small, but we need to change the current mindset that climate change is too hard to deal with on farm and look for the easy ‘low hanging fruit’ so that we make a start.

The debate around the environmental impact of food will intensify, not reduce, in the next few years.

Recommendations

New Zealand farmers need to be realistic about the threats both on and off farm from climate change. NZ farmers need to actively look for the opportunities climate change will bring – both in NZ and in the marketplace.

R and D is vital. Producers, industry and government, in their appropriate roles, all need to back climate change research. We need research into a wide range of aspects of how climate change will uniquely affect New Zealand. For meat producers GHG emissions are a key area and we need a strong collaborative approach into livestock ruminant emissions research.

Investigation of opportunities for trialling use of waste and by-products at meat plants for energy production. Seed funding for this could appropriately come from government funding sources.

Increase the level of co-operation with overseas researchers and technology experts in the field of climate change and agriculture.

We must continue to cultivate and enhance our ‘natural’ image in overseas markets.

We need more collaboration and co-ordination between New Zealand exporters in our markets – brand ‘New Zealand’ is our greatest asset.

The UK markets and media are looking for information on food miles and carbon foot printing - we need to give them good quality information and good stories to state our case.

More research into the specifics of carbon equivalent foot prints for a range of New Zealand agricultural situations. We need industry examples and methodology particularly in the agricultural sector. Where are the easy things to change even if the gains are smaller? Are the differences between farm types and regions significant?

Use of small grants, pilot projects to get things happening in New Zealand that are everyday overseas in the energy and agriculture sector e.g. more use of by-products and waste.

We need to start small – on and off farm- but we need to look to where we can make simple and easy changes to how we do things to decrease our greenhouse emissions throughout meat supply chains. Each part of the chain needs to understand its contribution and make changes. It may be easier to make larger gains in some areas than others – e.g. refrigeration techniques, but all parts of the chain including on farm need to look to what they can do in the short-term as well as the longer term where new technology and research may make a substantial contribution to solutions.

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Appendix 1: Tesco Speech

Speech by Sir Terry Leahy given to invited stakeholders at a joint Forum for the Future and Tesco event in central London on January 18th 2007

Sir Terry Leahy
TESCO, CARBON AND THE CONSUMER
18th January 2007

Good evening ladies and gentlemen.

Peter, thank you for chairing this event. And thank you to Forum for the Future for your help and advice on sustainability issues.

This is my first speech on the implications of climate change. It is a crowded field and I promise not to make a habit of it. I'm an unlikely campaigner – except perhaps a campaigner for the consumer.

Let me make it clear at the outset. I am not today going to focus on other important issues such reducing packaging waste, recycling, local sourcing or ethical trading. I will talk more about these issues on another occasion this year.

So why a speech from me solely on climate change? And why now?

The reason is simple.

We now know that the implications of climate change are huge. I am not a scientist. But I listen when the scientists say that, if we fail to mitigate climate change, the environmental, social and economic consequences will be stark and severe. This has profound implications for all of us, for our children, and for our children's children.

For each one of us this poses a challenge. What role are we to play? Passive or active? Follower or leader?

There comes a moment when it is clear what you must do.

I am determined that Tesco should be a leader in helping to create a low-carbon economy.

In saying this, I do not underestimate the task. It is to take an economy where human comfort, activity and growth are inextricably linked with emitting carbon. And to transform it into one which can only thrive without depending on carbon. This is a monumental challenge. It requires a revolution in technology and a revolution in thinking.

We are going to have to re-think the way we live and work.

For Tesco this involves something much more than listing a series of environmentally friendly actions, although those do play their part. It demands that we transform our business model so that the reduction of our carbon footprint becomes a central business driver.

Tonight I will explain the contribution I want Tesco to make.

As a growing international business, we must set an example by measuring and reducing our greenhouse gas emissions. By setting targets that stretch our business. And by committing to do this in a public way, so we are transparent and fully accountable for what we achieve.

We must also help to stimulate the development of low-carbon technology, and work with our suppliers and others to deliver significant CO2 reductions throughout our supply chain end to end.

I will explain how these actions will deliver a fundamental shift in our business operations internationally. They are radical plans that match the scale of the challenges set out in the Stern Review.

But first and most importantly, I want to talk to you about how we can use our unique relationship with our customers to help deliver a revolution in green consumption, with the fight against climate change at the very heart of it.

DELIVERING GREEN CONSUMPTION

The last quarter of the twentieth century saw a consumer revolution which improved the lives of millions of people. It was delivered partly by advances in consumer information. But better information alone was not enough. For many people affordability was and remains a bigger barrier.

Tesco's achievement has been to break down the twin barriers of price and lack of information. We have taken products and services that were out-of-the reach of ordinary people and made them affordable and accessible to millions.

In the early part of this century we must now achieve a new revolution in green consumption.

The barriers are familiar. People talk about green choices, but for millions of people a lack of information and affordability limit this choice. We will not tackle the challenge of climate change by enlisting only the few.

The green movement must become a mass movement in green consumption.

For this to happen we must break down the barriers of information and price. Customers need good information to make the right choices and they need to be able to afford to make these choices.

To achieve a mass movement in green consumption we must empower everyone – not just the enlightened or the affluent.

Tesco cannot do it alone. I welcome the growing number of business voices determined to make their special contribution.

But our size and our reach make a particular responsibility and opportunity. We sell food, clothing, and household goods to every section of society and to markets across the world.

The market is ready. Customers tell us they want our help to do more in the fight against climate change if only we can make it easier and more affordable.

The huge growth in sales of organic food is testimony to the fact that people will make greener choices if we give them the right information, opportunity and incentive. The competitive pricing of organic products means that, for many, they are no longer luxury items. We now sell them alongside the standard ranges, on the same shelves, instead of in a separate section. We have improved the range and this has helped to create a phenomenal 39% year-on-year growth in sales.

In the same way we now have to make sustainability a significant, mainstream driver of consumption. I see this as a tremendous opportunity for Tesco. I believe we can do it better than anyone. We have become Britain's most successful retailer by serving everyone, not just the few.

THE KNOWLEDGE TO CHOOSE

The Carbon Count

To create a mass movement in green consumption we must provide better information.

Clear information about the carbon cost of the products we buy will enable customers to make effective green choices. Customers want us to develop ways to take complicated carbon calculations and present them simply.

We will therefore begin the search for a universally accepted and commonly understood measure of the carbon footprint of every product we sell – looking at its complete lifecycle from production, through distribution to consumption.

It will enable us to label all our products so that customers can compare their carbon footprint as easily as they can currently compare their price or their nutritional profile.

Everyone here can see how this could open up even more exciting avenues. Armed with this information the customer is really in charge. And we can help our customers in so many ways – for example through Tesco Clubcard and Tesco.com we can make it easy for them to measure and reduce their carbon footprint in real time – day-by-day and week-by-week.

A Carbon Currency

Many of those people who talk about the need for a carbon currency say it is too complicated to develop; that it will take years. However, at Tesco, we believe in action, in overcoming hurdles, in making complex problems simple.

So we will take on this challenge with enthusiasm. It will of course require expertise from many quarters, and the widest possible partnership. I see a real need for a new type of academic institution to lead this work – a Sustainable Consumption Institute.

I can announce this evening that Tesco will take the first step towards developing this Institute by commissioning work from the Environmental Change Institute (ECI) at Oxford University, on identifying and overcoming the carbon pressure points in our own operations and supply chain.

This work can best be done in collaboration with our world-class suppliers and distributors, and our retail colleagues. We have already begun to work with Unilever and are looking to collaborate with many others around the world.

In the Meantime

While we work hard to meet these commitments we can take some other steps. Inevitably, some are incremental but nonetheless worthwhile.

If we are to tell our customers the carbon cost of every product, we owe it to them too to minimise that cost.

We must provide more efficient, and better value, products. And we must show customers how their individual choices will make a difference.

Last year we made a start by giving customers Green Clubcard points for re-using carrier bags. We have already reduced the number of new bags we have given away since the launch by nearly 300 million – that is 14 million fewer plastic bags every week. Initiatives like this build confidence that individuals, acting together, can bring about change. It helps to break down another barrier - the thought that "I can't make a difference"" – and replace it with a new belief that "Together, we can make a difference".

Tonight I can announce a number of new Tesco initiatives that I hope will excite customers and stimulate more green consumption:

- One of the first of our new initiatives will be to bring down the cost of being green. Energy-efficient light bulbs can use less than a fifth of the energy of conventional bulbs. They can last ten times as long. But they can cost up to ten times as much as conventional bulbs. So price is a barrier for many customers. We will take a big step towards removing that barrier by halving the price of energy-efficient light bulbs. And we will do this as part of a campaign to be co-ordinated by The Climate Group this Spring. This will shift the balance of economics in favour of ordinary families.
- There is not currently an energy-efficient equivalent for every standard light bulb. We will work with our suppliers towards making sure that, for every light bulb, there is an energy-efficient alternative that provides an equivalent performance.
- We will also offer more energy-efficient products throughout our Value range at value prices. We hope this will help to make green choices a real option for the less affluent and those living on tight budgets.
- We know that customers make the right choices if they are given clear information. Our GDA nutritional labelling scheme demonstrates this. We will work over the coming

months with the Energy Savings Trust to develop stronger energy-efficiency labelling for our electricals products – from light bulbs to TVs.

- We will promote and incentivise energy efficient products through our Green Clubcard scheme – televisions which use less energy both when they are on and in standby; energy-saving kettles and set-top boxes; energy-efficient power adapters and intelligent plugs that switch off appliances when they are not being used. We will also use our Green Clubcard scheme to encourage re-use and recycling as well as organic, Fairtrade, biodegradable and other green products. We will write to all our Clubcard customers in February to set out our Green Clubcard plans.
- It is important that we equip the next generation with as good an understanding as we can of why a low-carbon economy is important, and how it can be achieved. That is why we are launching the Kids Carbon Calculator with DEFRA and the Royal Society of Arts. It will show children how simple everyday choices, like sharing a car for the school run, or buying seasonal fruit, can make a big difference.
- Tesco is the UK market leader in the sale of biofuels to customers. We offer a 5% bioethanol mix at 185 petrol stations at the same prices as standard unleaded. All 181 of our filling stations in the South East and North West of England have been converted to biodiesel. Over the next twelve months we aim to double the proportion of biofuels we sell, and increase the number of petrol stations in which we sell them to over 300.

We must also face up to the debate about food miles. That will mean a whole series of actions to reduce the carbon footprint of our distribution system and I will speak of those a little later because it is important to remember that food miles are not just about air miles. However, we cannot avoid the fact that transporting a product by air results in far higher carbon emissions than any other form of transport.

We are not willing to avoid the hard fact that there is a conflict between the issue of carbon emissions and the needs of some of the poorest people on earth whose lives are improved by the ability to sell in our markets products which are brought here by air.

There is a strong international development case for trading with developing countries. So, the question is: should we shun Fairtrade horticulture from East Africa to save CO2, or champion it as an important contribution to alleviating poverty?

To try to resolve that conflict, we will seek to reduce our reliance on air transport overall by restricting it to less than 1 per cent of our products, with a bias to the poor countries.

Even so, we believe that judgements on competing priorities like these should ultimately be decided by our customers. We must better inform their decisions.

So we have decided that, as an interim step while we develop a carbon labelling system, we will put an aeroplane symbol on all air-freighted products in our stores – not as we did 20 years ago as a symbol of freshness, but as a basis for informed decision-making. I am pleased that this decision has also been made by M&S.

But It cannot be more than an interim measure. It will not tell the whole carbon story. A product grown outdoors in a warm country and flown to the UK may have no higher a carbon footprint than a product grown out-of-season in Europe in a heated greenhouse.

So our aeroplane symbol will indicate one aspect of the carbon used to bring a product to our stores, but not all. It is a first step on the journey we have begun.

SETTING AN EXAMPLE

I have explained how I see Tesco leading a consumer revolution in green consumption. I now want to talk about the two other roles Tesco will play.

How, as a growing international business, we will set an example by measuring, publishing and reducing our greenhouse gas emissions.

And how we can also stimulate the development of low-carbon technology.

We have a target that, by 2010, we will have halved the average energy use in our buildings compared to what it was in 2000.

I am pleased to say tonight that we will not only meet this target. We will meet it two years early – in 2008.

It is, I accept, a relative not absolute target, and I shall say more about targets in a moment. But let me point out one fact.

This year Tesco in the UK has achieved an absolute reduction in energy use in our buildings, despite growing by more than 8%. We are using less energy this year than last, even taking into account our new stores and extensions.

We have achieved this by making energy reduction a top priority throughout our business – from the boardroom through to our staff working in our stores.

Our staff are crucial. Every Tesco store has an energy champion. All our energy champions will get together for a conference next month – to learn, share knowledge and celebrate what they have achieved so far.

New technology is also crucial.

We have now built three energy-efficient stores in this country to test new equipment and ideas that we intend to roll out across the business. Our first such store in Diss reduced energy consumption by 29% compared to a standard Tesco store of its size. At Swansea we achieved a 36% reduction. Our most recent environmental store, which opened in Wick last November, has a carbon footprint 50% lower than our current standard stores of that size.

Much of the technology first trialled in our environmental stores is now becoming standard in all our stores. For example:

- More energy-efficient ovens, refrigeration and air-conditioning - the big users of energy in stores.
- More efficient lighting, and timers and motion detectors that switch off the lights when they are not needed.

- Redesigned fridges to keep more of the cold air in - cutting energy use by 10%.
- Equipment that retrieves cold air from our chiller cabinets to use as an energy-efficient alternative to air-conditioning on the sales floor. And heat recovered from our machinery to use as heating when that is needed.

Other innovations at our latest environmental store at Wick may also become mainstream. For example:

- Reducing embedded carbon by using timber rather than steel for the store.
- Making our roofs and ceilings lower to reduce the space we need to heat and cool.
- Using more north-facing windows to compliment artificial light with natural light. And installing photo-voltaic panels on our south-facing roofs to generate renewable energy.

We will open our next environmental store in Shrewsbury this Spring. There we want to reduce carbon emissions by 60% compared to a standard store. In Shrewsbury we will run our Tesco.com home delivery fleet on fully electric vans. This will deliver a saving of 100 tonnes of CO2 per year, on top of the 6,000 customer car journeys that each delivery van already saves each year.

We will also open our first Environmental distribution centre at Livingston.

Our international business is another source of innovation. Our Rama 1 store in Thailand, which opened over three years ago, has solar paneling over its whole roof. Our environment store in Turkey will have an earth and grass roof, and will use geothermal power. Our new business in California is also placing a big emphasis on saving energy and carbon emissions: we have announced today that its distribution centre will include California's largest roof installation of photovoltaic solar power.

Over the next year, we will build new environmental stores in the Czech Republic, Poland, Hungary, Turkey, Korea, Malaysia, Thailand and hopefully in China and Japan too.

This will be a practical and direct way of building on what we have learned as a business, and stimulating low-carbon technology in developing countries around the world.

It is by being focused, working hard and investing more than £65m last year alone in lower-carbon technology that we will achieve our energy reduction target two years early. Over the next five years we will spend more than £500m in reducing our energy use.

The Stern Review explains how important it is to develop new low-carbon technologies.

We have learned from our experience that there is often a frustrating gap between being able to identify the technology that is needed – whether on low-energy lighting or lower-emissions refrigeration – and being able to purchase and apply that technology commercially. We will work with our suppliers to reduce and hopefully eliminate this gap.

Our Sustainable Technology Fund created last May established an additional ring-fenced £100m to help to close that gap. To support low-carbon technologies that are not yet fully economically viable. To improve their application so that they become commercially viable.

We are investing in, or examining seriously, a number of technologies:

- We have installed 10 wind turbines, and have sought planning permission for many more. We are looking closely at the next generation of vertical axis turbines.
- We have shown at Swansea that combined heat and power has a practical application in our sector, and plan another 10 plants this year.
- We are developing a gasification solution to turn our food waste into clean, sustainable power.
- We are investing in a straw-fired generator at Goole, delivering biomass combustion, steam cycle and steam turbine power.
- We also made a significant investment in a new biodiesel plant at Immingham.

I am confident that our £100m fund will make a real contribution to developing sustainable low-carbon technology.

Our transport fleet accounts for under a sixth of our CO2 footprint – perhaps less than people might generally think. But it is important to reduce emissions on transport as well. A more efficient distribution system also delivers other benefits, such as less congestion on the roads, less noise and less pollution.

I am pleased that, over the past year, we have cut by 10 per cent the amount of CO2 emitted in our distribution network to deliver a case of goods. Over the next five years we will make this a 50% reduction.

We are improving the way we fill our vehicles. We are working with our suppliers so that their vehicles do not travel empty after making a delivery. And we are investing in double-deck trailers which carry up to 80 per cent more products per load.

We are also investing in alternatives to distribution by road. We have switched to rail for transporting goods from our Daventry depot to Scotland. We want to do more of this, and I urge the Government to build on its commitment to rail as an alternative to road for moving goods around the country.

We want to make road distribution greener too. From this month, three-quarters of our distribution fleet is running on a 50 per cent biodiesel blend. This is the highest percentage biodiesel blend used by any major distribution fleet in the world. It is equivalent to removing over 20,000 medium sized cars off the road. We will extend the use of 50:50 biodiesel to our entire distribution fleet this year.

Future plans

What I have set out is a start. But we can do more, and we will.

We will measure and publish our total carbon footprint as a business. We know that our direct footprint in the UK is around 2m tonnes of CO2 per year. Our buildings – and in particular our refrigeration – account for a significant proportion of these emissions.

But climate change and CO2 emissions are global issues, and Tesco is an international business. So we have commissioned Environmental Resources Management (ERM) to map the total direct carbon footprint of the Tesco business across all the countries in which we operate. This work will give us a clear, independently-verified baseline from which to track our progress. It will also enable us to identify those areas of our business we will need to prioritise in reducing emissions. We will also increase our understanding of our indirect carbon footprint - the emissions created by our suppliers and customers – so we can work with them to reduce our overall impact on the environment.

We want to do this openly. So we will publish our carbon footprint, in a similar way to our price checker, on our Tesco.com website.

Our verified carbon footprint will include all our existing stores and distribution centres worldwide. We will reduce emissions from these buildings by at least 50 per cent by 2020.

This is in addition to the 50 per cent reduction in average energy use in our UK buildings that we will have achieved by 2008.

We are determined to play our part responsibly, but to do so as a growing business. We will not achieve our common goal of a sustainable future if reductions in CO2 are achieved by impeding beneficial economic growth. We need growth to create jobs, to raise communities out of poverty, to strengthen opportunity and reduce inequality, and not least to fund the pensions that we will all rely upon. We also need growth to fund the technological innovation and investment that must underpin a low-carbon future.

But we must achieve growth in a way that helps deliver a low-carbon economy. Indeed, we have found that we can become more efficient as we grow.

So we will ensure that all new stores we build between now and 2020 emit on average at least 50 per cent less carbon than an equivalent store in 2006.

Stimulating new technology

We will continue to invest in sustainable technology and roll it out to more and more of our stores. To do this, we need help from government.

Sir Nicholas Stern noted in his recent report that increasing carbon emissions were a potentially catastrophic example of market failure. Governments can successfully use market and trading mechanisms to correct this failure. That is why I welcome in principle the UK Government's proposals for an Energy Performance Commitment Scheme. Clearly, the details of the EPC need to be worked through, but the principles of emissions caps and trading mechanisms appear sound.

Government is taking steps to stimulate public and private investment in technology. This must increase in pace.

In some cases, however, the speed of investment in technology is being limited by the time taken to secure planning permission – for example for wind turbines.

I therefore urge Ministers to deliver quickly on their assurances that they will make it easier and faster to negotiate planning in this important area.

I also call on Government to reward green buildings. This means supporting investment in low carbon technologies through business rates and other incentives.

As a food retailer, refrigeration currently accounts for over a third of our direct carbon footprint in the UK. The vast majority of large refrigerators in the food industry currently use HFC refrigeration gases. These were introduced as a replacement for the ozone depleting CFCs and HCFCs – but we know that HFCs are extremely potent greenhouse gases.

We are therefore leading a programme to phase out their use. We have so far installed two alternative non-HFC systems – one based on CO2 and one combining CO2 and hydrocarbon refrigerants.

We are sharing what we learn with all interested parties to speed up and promote the use of natural refrigerants.

We also suffer in this country from a shortage of technicians skilled and trained to work on low-carbon technology. We want to work with government and others to remedy this skills gap. We are already beginning to train a new generation of environmental engineers, maintenance technicians and energy champions.

Conclusion

Tesco has a strong history of responding to new challenges in ways that galvanise and empower the customer. In the twentieth century, through self-service shopping, bulk buying, bar coding, and centralised distribution, we helped deliver a consumer revolution that turned luxury products for the few into everyday products for the many. Each of these changes required leadership and new ways of thinking and doing things.

The challenge of creating a low-carbon society will require another revolution in thought and action – a revolution in green consumption.

I admire the work of our great environmental NGOs. Over many years they have created and nurtured this idea of green consumption.

But it must now grow into a mass movement. This is where business and Tesco can make a huge contribution.

Too often on issues like sustainability, Tesco has come to be portrayed as part of the problem. This could not be more wrong. When you want to reach and empower the many, Tesco is a big part of the solution, not the problem.

Consumers have a new need: to live more sustainably, and to consume products and services which are more sustainable. Our role as a business is to give them the information and the means to achieve this change. If we satisfy this need we will be rewarded with custom and loyalty. Other businesses will respond to this new competitive challenge by devoting more

resources and more creativity to the task. Society and the economy will move ever faster down the road of sustainability.

When I set out our plan for Tesco in the Community last May, I said that the battle to win customers in the 21st century would increasingly be fought not just on value for money, range and convenience, but on being good neighbours, behaving responsibly and seizing the environmental challenges. I am even more convinced of this today.

I believe in the power of the consumer. And I believe Tesco has a unique relationship with consumers.

Together with our customers, suppliers and other partners we can transform green consumption from a minority to the mainstream.

It will be a revolution in sustainability. And it will be our contribution to the fight against climate change.

Thank you.