IN THE BALANCE?

The Future of the English Beef Industry

A Special Report
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The English beef industry is in trouble. At a time of strong livestock prices and a strong export performance, this may seem an incongruous statement. There will be no sudden collapse of the industry such as that we have witnessed in the banking sector. Rather, the reality is that the beef industry is in a slow, steady decline. It must not be allowed to become an irretrievable decline.

Regrettably, this state of affairs is not adequately recognised by policy makers, by key players in the food industry, NGOs or, it seems, by the general public.

The breeding herd - the basic ‘seed corn’ of the industry - has been declining over several years and, with it, beef production. This is despite strong consumer demand for beef. We are importing an increasing proportion of the country’s beef requirements, in some instances from countries where animal husbandry, labour and environmental standards do not match our own, and where the carbon impact of beef production may be higher than in this country.

At the heart of the problem is the fact that the beef industry for several years has been in a chronic condition of low profitability: rising costs have not been covered by adequate returns from the marketplace. This has damaged business confidence, resulting in a lack of investment in production and processing systems and in the skills of the young men and women that are the future of the industry. This loss of confidence has been compounded by a series of very severe external shocks - including the BSE crisis in the mid 1990s, the 2001 Foot and Mouth Disease outbreak and the 2007 FMD outbreak – which have impacted on the market place and producers’ finances.

The scope for improvements in both technical and business performance by beef producers is very substantial. The range in performance between the average and the best producers is considerable. The industry itself must tackle this issue, and addressing it is a key task for EBLEX through its Knowledge Transfer work. Much good work is being done and there is more to do. But even many of our technically best producers are not securing a reasonable income and proper return on capital invested.

The end of direct production subsidies following the 2003 CAP reform agreement has starkly highlighted the over-dependence of much of the industry on these payments. It is clear that the marketplace has still not properly adjusted to reflect these fundamental policy shifts.

The beef supply chain remains convoluted and opaque. Strong retailer pressure on suppliers and a lack of transparency in the supply chain squeeze margins, distort market information, too often create adversarial relationships, and ultimately lead to inefficiencies and higher costs. High regulatory costs are further burdens on operators in the chain; these costs tend to get passed back down the chain rather than be reflected in final prices.

Meanwhile, the economic, environmental, nutritional and cultural contributions of the English beef industry tend to be swamped under often-unchallenged assertions about the negative environmental and nutritional impacts of beef production and red meat consumption. The beef industry recognises the environmental challenges it must address, notably that of climate change, and is taking appropriate action.

Far too often, for example, the public and others fail to recognise that greenhouse gas emissions from the UK livestock sector are falling (and the industry understands the need to do more) and that some statements about global greenhouse gas emission figures bear little or no relation to the UK context; that a proper balance of livestock numbers...
and species maintains important grasslands and wildlife habitats; that livestock use land that is unfit for growing other food crops; that livestock make a critical contribution to the look of our countryside and, hence, to tourism and the cultural life of our nation; or that beef is an important part of a balanced diet, a valuable source of a range of minerals, vitamins and high quality protein, and of particular importance to certain groups, including pregnant women, pre-school children and teenage girls.

The challenging situation in which the industry finds itself is neither inevitable nor irresistible. EBLEX recently published a separate report, ‘The Dynamics of Change’, which examined in detail the supply and demand trends in the beef and lamb category and which was aimed principally at industry.

‘In the Balance?’ is aimed at a wider audience - food retailers and the hospitality industry, policy makers, parliamentarians, concerned NGOs and the agricultural media. It sets out an independent and objective assessment of the current situation and the immediate outlook for the English beef industry (though many of the issues raised apply across the UK as a whole). It describes the structure of the beef industry, its economic contribution, its competitiveness and key market trends. The role of cattle as a major land user is also outlined. The adaptation and mitigation issues around climate change are explored. Finally, the nutritional attributes of beef as part of a balanced diet are explained.

This report seeks to establish a clear and shared appreciation of where the beef industry is now and where it is heading in the future on the basis of current trends. Its key aims are to encourage interested parties to take a more strategic view of the domestic industry and the place of English beef in the marketplace and to foster a coherent and informed debate about the future of our industry.

John Cross  Chairman, EBLEX

ABOUT EBLEX

EBLEX is the organisation for beef and lamb levy payers in England, and is a division of the Agriculture and Horticulture Development Board, a statutory Non Departmental Public Body. The EBLEX Board oversees a strategy delivering a wide range of technology transfer, marketing and promotional programmes to farmers, consumers and businesses in the beef and lamb supply chain.

EBLEX is mainly funded through an AHDB levy paid on all cattle and sheep slaughtered in or exported from England.
Executive Summary

Beef derives from both the suckler herd and the dairy herd. At present the shares of beef produced from the two herds are almost equal. Production takes place in a wide range of systems according to several factors, with producers often specialising at various stages of the production process. In this sense there is no single, typical system.

There has been a consistent fall in the size of the English breeding herd over many years (by 27% between 1990 and 2007) and this is forecast to continue. This decline in the breeding herd, together with tighter cattle supplies and lower slaughterings, means that domestic beef production is declining. With robust demand for beef, there is an increasing reliance on imports to meet the shortfall in domestic supplies. While cattle prices have increased since 1990 in current terms, in real terms prices have fallen.

There has been a steady fall in the number of abattoirs and a concentration of ownership in the processing sector.

The beef sector accounts for around 12% of the value of output of UK agriculture, and employs about 125,000 on English cattle farms.

The removal of direct production subsidies as a result of CAP reform has highlighted the financial over-dependence of many beef producers on these payments. Direct subsidies also distorted market signals, and the marketplace has not properly adjusted to reflect these changes.

In-depth EBLEX surveys of beef producers’ financial accounts show that ‘average’ producers are making negative net margins, and even the best producers in some systems are losing money. This highlights the continuing need for Knowledge Transfer work to encourage producers to take up and apply best technical and business practice. But this is not the complete answer.

Low profitability is damaging business confidence and constraining investment.

The beef supply chain is convoluted and opaque. There is a need to improve the efficiency and working relationships and to share margins more fairly along this chain.

Cattle production is well-suited to England’s climate and its rich grassland resources. Much of the grassland that cattle graze cannot grow other food crops. Grazing cattle also help to maintain valued and varied landscapes and wildlife habitats. And manures and slurries are valuable sources of organic manures, reducing the use of nitrogen fertilisers.

The English beef industry needs to improve the efficiency of its water usage, but its water footprint is low compared with systems in many other beef-producing countries.

Climate change poses mitigation and adaptation challenges to the English beef industry. Beef production is a significant source of greenhouse gas emissions. The industry recognises this and is taking steps to address the issues. But the livestock sector’s GHG emissions are falling, and it should be remembered that cattle graze land that itself stores carbon.

The relative merits of different beef production systems are a complex issue that need careful consideration. In any case, it has to be recognised that, declining domestic beef production means an increase in imports from countries where, in some cases, the carbon equivalent cost of each kilo of imported beef consumed may be higher.

Beef is an important part of a balanced diet. It contains high quality protein and is an important source of minerals and trace elements, in particular iron and zinc, and of a range of B vitamins and vitamin D. The industry has successfully worked to reduce the fat content of beef, and while beef contains some saturated fats, over half its total fat content is a mixture of unsaturated fats, n-6 polyunsaturated fats and conjugated linoleic acid.

There is a risk of sleep walking towards the irretrievable decline of a part of our farming industry for which Britain is renowned. All those with an interest in the English beef industry are urged to take a much more strategic view of the industry’s current situation and its outlook.
Profile of the Beef Industry

OVERVIEW
Beef derives from cattle from both the suckler herd and the dairy herd (see Figure 1). Overall, at present the shares of beef produced from the dairy herd and from the suckler herd are almost equal.

At farm level, production takes place in a variety of production ‘systems’, with producers specialising in breeding, rearing and producing certain types of animals for meat in a range of feeding systems according to factors that include topography, location and availability of forage and feed. The main categories of cattle reared and marketed are:

- breeding animals - the mothers of animals intended for production of beef for human consumption
- ‘store’ animals - cattle that are intended for slaughter to produce beef for human consumption but which are not yet at the point of optimum condition for the marketplace
- ‘finished’ animals - cattle that are ready for slaughter to produce beef for human consumption.

THE DAIRY HERD
Dairy cows are mainly found in the lowland grass growing areas of Cumbria, Cheshire, Lancashire, Somerset and Devon. Around 92% of the dairy cows are Holstein or Friesian breeds or a cross between the two. The relatively short productive life of dairy cows (on average, three lactations) means that most young female dairy animals are intended to enter the dairy herd for milk production. Around 20% of dairy cows are inseminated with the semen of a beef breed animal to produce offspring with beef breed characteristics.

Most Holstein male calves are also used for beef production, being retained as bulls and intensively finished (and fed mainly on cereals) at 14-16 months old producing 280 kg carcases. Around 25% of Holstein male calves have little or no commercial value and are disposed of shortly after birth as ‘bobby veal’.

Figure 1
The Structure of Beef Production in England, 2008 (based on June census)
Today, beef cross dairy heifers (the young female offspring of a dairy cow mated to a beef bull) are less likely to enter the suckler cow herd, as more and more suckler herds source their replacement stock from within the herd. The majority of beef x dairy heifers are now finished for beef in a variety of production systems (mainly forage based), and are finished at between 20 and 30 months of age, producing 300kg carcases.

Dairy cross beef males are in the main castrated and finished as steers, mainly on forage, in a variety of systems, frequently changing ownership. The average age at slaughter is 24-30 months of age.

THE SUCKLER HERD
The suckler herd is mainly concentrated in the north and west of England, with some pockets in the upland areas of eastern counties or on coastal rough grazing. Suckler cows tend to be located on more marginal grazing land than are dairy cows. In upland areas they are often used to complement sheep in areas of semi-natural rough grazing. Their role is to help manage pasture for the benefit of sheep. In lowland areas sucklers are often grazed on steep or poor quality land, which would not be suitable for arable cropping.

Many suckler herds are now self-replacing, so female calves will often be reared as replacement breeding animals. Those that are deemed to be unsuitable as mothers are taken into a finishing system for slaughter as beef. Feed is mainly forage and heifers are slaughtered at 20 to 30 months old, producing a 300 kg carcase.

Some breeder-finisher livestock producers, usually in the lowlands, keep suckled bulls entire (ie uncastrated) and finish them intensively, mainly fed on cereals. These animals constitute around 10% of suckled male production producing carcases of 320kg. The majority of male suckled calves are castrated and sold as stores at 6 -12 months of age for finishing by specialist finishers. Typically these stores will be finished at 24 to 30 months of age off forage, producing 340 kg carcases. As with dairy-bred males the stores may change ownership a number of times before final finishing and slaughter.

TRENDS IN THE BREEDING HERD
There has been a consistent annual fall in the English breeding herd for many years, and this is forecast to continue. Between 1990 and 2007 the total breeding herd fell by 27%. The dairy herd fell by 38%, while the suckler herd has remained fairly stable over this period (see Figure 2).

The comparatively faster rate of decline in the dairy herd is due partly to improving milk productivity (and the effect of the production limit imposed by the EU milk quota system), as well as a protracted period of poor returns to milk producers and the pressures of environmental regulations.

The English breeding herd has been falling over several years and, with it, beef production … on current trends this is forecast to continue.

The suckler beef herd remained comparatively stable until 1998, in part sustained by the operation of the production-linked subsidy system that prevailed under the EU Common Agricultural Policy (CAP) up to 2005. The negative impact of the BSE crisis in the latter half of the 1990s was followed by a period of partial recovery until 2005, since when the impact of decoupling - the end of production-linked subsidies - under the 2003 CAP reform agreement has prompted a decline, that, on current trends, is expected to continue.

The recent pattern of cattle registrations suggests that the share of beef from the dairy herd could increase in the short-term, particularly if there is a greater uptake of dairy-bred bull calves for finishing. An expected slow down in the decline of
the dairy herd and an acceleration of the rate of fall in the size of the beef herd will further increase the share of beef derived from the dairy herd.

Across the UK, the average size of dairy herds is increasing (from 67 animals in 1995 to 85 in 2006). Over the same period the number of holdings with dairy cows fell by 38%. This highlights the structural change in the dairy sector towards fewer farms with larger herds, though factors such as the availability and cost of labour may moderate the rate of this rationalisation.

On the other hand, in the specialist beef sector, the average size of suckler herds has increased only slightly (from 25 to 28 animals over the period 1995 to 2006), accompanied by a 12% drop in the number of holdings. This suggests that suckler cows are more suited to smaller scale systems, sometimes run on a part-time or hobby farming basis, and/or that it is easier to trim the size of suckler herds compared to dairy herds according to economic conditions. The outlook is for a continuation of the trend towards a fall in the number of suckler holdings with no significant change in the average herd size.

**STRUCTURE OF THE PROCESSING SECTOR**

The number of abattoirs in Great Britain has been gradually declining for many years. In 1985 there were 1,000 operational abattoirs servicing a meat and livestock industry in Great Britain where there were still over 21,000 retail and other butchers shops that accounted for 68% of beef and lamb, and 65% of pork retail sales. The large multiple retailer sector as we know it today was at this time still in its infancy and its largely high street-located supermarkets only accounted for around 26% of beef and lamb and 29% of pork retail sales.

Over time, new legislative requirements - notably with respect to meat hygiene standards, more centralised licensing and inspection arrangements, and harmonised EU food hygiene legislation - as well as steps by the big retailers to rationalise their supply bases and the high costs of investment in further processing activities have led to steady concentration in the abattoir sector. This has been accompanied by concerns about the geographical distribution of abattoirs and the ability of smaller operators to meet the needs of livestock producers in more remote areas, and to service more niche and specialised markets.

By 2007, the number of GB abattoirs had fallen to 277 (of which 218 were located in England), and the sector had become more concentrated with the 10 largest companies in 2006 slaughtering cattle accounting for 57% of total cattle slaughterings (the top 10 sheep slaughterers accounted for 53% of total sheep slaughterings, and the top 10 pig slaughterers for 75% of total pig slaughterings).

The number of retail butchers has fallen to below 6,800 and the proportion of sales through them continues to decline. In 2007, total butchers accounted for only 10%, 14% and 11%, respectively, of all beef, lamb and pork retail sales.
The Beef Market

SUPPLIES

Figure 3 shows the changing pattern in the source of UK-origin beef. Historically, the bulk of beef derived from the dairy herd (largely reflecting the relative size of the two herds), but today the shares of beef from the dairy and beef herds are almost equal.

Since 1990 in the UK, the number of prime steers and heifers destined for the food chain has declined. Between 1990 and 2007, for example, slaughter numbers fell by 28% for steers, by 23% for heifers and by 7% for young bulls. A very noticeable decline has occurred since 2005 following the implementation of the CAP reform agreement. Between 2005 and 2008 the number of young bulls slaughtered is down 37%, steers down 7% and heifers 1.2% lower.\(^1\)

The BSE crisis in 1996 led to a ban on cattle of over thirty months of age (OTM cattle) from the food chain. This meant that in the decade from 1996 prime cattle (ie younger animals not used for breeding) were the only source of beef in the UK. When cull cows and over thirty month cattle were allowed to re-enter the food chain from late 2005, slaughterings of these animals partially offset the decline in prime cattle numbers.

In production terms, therefore, although output increased significantly following the lifting of the OTM ban in 2005, the expectation is that production will decline over the next five years (see Figure 4). Any turnaround is unlikely before 2011 because of the length of the beef production cycle, and would to a large extent depend on whether producers are sufficiently encouraged by what, at the present time, are comparatively good farm gate prices to invest in their businesses. Should a turnaround materialise, production might follow the upper dotted line shown in Figure 4.

Domestic demand is robust, yet the UK’s self sufficiency in beef has fallen from 109% in 1995 to 80% in 2008.

For a short period in the early 1990s the UK was a net exporter of beef, with exports hitting an historic high in 1995. The export ban that followed the BSE crisis lasted for 10 years. While the Date-Based Export Scheme allowed some UK exports from 2003, the terms of the scheme were very strict, and exports of any significant volumes only resumed in 2006. While exports are now increasing, they remain well below 1995 levels (see Figure 5).

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\(^1\) The decline in heifer numbers means fewer are being retained for breeding, which leads to the overall downward trend in the breeding herd. The ending of production-linked subsidies has made production, particularly of bull finishing, less financially attractive and prompted many producers to cease or scale back production.
As a result of the shortfall in supplies for domestic consumption arising from the ban on over thirty month cattle entering the food chain, beef imports into the UK shot up. Despite the re-introduction of over thirty month cattle into the food chain, robust domestic beef consumption and tight supplies of UK cattle mean that imports are likely to remain at around 300,000 tonnes.

The fall in consumption precipitated by the BSE crisis in 1996 has been reversed (see Figure 6). Indeed, with strong consumer confidence in British beef, total consumption is now 12% higher than in 1990. Consumption is expected to be at least maintained at present levels, with the upper limit of consumption dependent on adequate supplies (whether from domestic production and/or imports) and, with the economic downturn, the level of consumer prices\(^2\).

**Figure 6**
UK beef and veal consumption, 1998 – 2013

![Figure 6](image)

**Figure 7**
UK Beef Balance, 1995 - 2009

![Figure 7](image)

Figure 7 shows the overall UK beef market balance since 1995. This highlights the impact of the BSE crisis in 1996 and the removal of over thirty month cattle from the human food chain, the gradual recovery in domestic production (with supplies boosted by the re-entry of beef from older animals into the food chain in 2005), an increasing reliance on imports and the strong recovery in beef consumption.

**Figure 8**
The Changing Composition of UK Beef Supplies, 1995 and 2008

![Figure 8](image)

**THE OUTLOOK FOR FUTURE SUPPLIES BASED ON CURRENT TRENDS**

- The forecast decline in the cattle breeding herd will of itself mean a continuing decrease in the supply of prime cattle for the foreseeable future.
- Any turnaround is unlikely before 2011 because of the length of the beef production cycle, and would to a large extent depend on whether producers’ prospects improve.
- Robust domestic beef consumption and tight supplies of UK and English cattle mean that imports are likely to remain at around 300,000 tonnes.
- The level of future exports will be determined by factors that include the sterling/euro exchange rate (a weak Pound stimulates exports) and the availability of cull cows (around 80% of UK beef exports derive from these animals).

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\(^2\) In terms of meal occasions, the current split in retail/in-home and foodservice/out-of-home consumption of beef and beef products is around 86%/14%. In value terms the in-home share, at around 65%, is higher than the 35% foodservice share (even taking into account that the foodservice value share includes payment of VAT when eating out and that foodservice gross margins are generally higher than retail gross margins). The economic downturn is expected to see a fall in the value of foodservice sales.
PRICES

To some extent the level of future supplies will depend on the level of farm gate prices. Figure 9 shows the trend in producer prices. It can be seen that prime cattle prices have varied significantly over the past couple of decades. Low points were during the aftermath of the BSE crisis and the Foot and Mouth Disease outbreak of 2001. Since then prices in absolute terms have steadily increased and by mid-2008 were at their highest levels since 1990, mainly due to the sustained recovery in consumption and, more recently, the tightening of cattle supplies.

While current prices have increased since 1990, in real terms beef producers are receiving less today than they were two decades ago.

But, while current prices have increased over the period since 1990, when inflation is taken into account, in real terms cattle prices have been falling and farmers are receiving less today than they were two decades ago.

Figure 9
Prime Cattle Prices, in Current and Real Terms, 1990 to 2008

(Real prices are expressed in December 2008 prices)
THE CONTRIBUTION OF THE BEEF INDUSTRY TO THE ECONOMY

The gross value of output of the beef sector represents just over 12% (£1.7 billion) of that of UK agriculture as a whole. After taking into account the value of inputs (feed, veterinary costs and medicines etc), the Gross Value Added of the beef sector is about £0.7 billion, equivalent to an estimated 0.06% of the total Gross Value Added of the UK economy (agriculture as a whole contributes about 0.5% to Gross Value Added).

In the UK it is estimated that around 230,000 people are employed on farms with cattle (including dairy cattle). Employment on cattle farms in England is about 125,000.

ECONOMIC SITUATION AND OUTLOOK FOR THE BEEF INDUSTRY

Figure 10 shows the trend in gross margins in lowland suckler herds based on MLC Beefplan results and EBLEX Business Pointers. It is important to note that the data up to and including the 2004/05 financial year include receipts to the farm in the form of direct livestock production-linked subsidies under the CAP. The figures for the years from 2005/06 onwards highlight the dramatic impact on profitability as a result of the ending of these subsidies following CAP reform.

As indicated earlier, low profitability and lack of business confidence amongst beef producers has led to a decline in the breeding herd. As potential breeding replacements are slaughtered, this temporarily boosts beef production as these animals enter the human food chain. But, over time, the longer term effect is to reduce domestic beef production, and, consequently, to place a growing reliance on imports to meet demand.

The implementation of CAP reform in 2005 removed direct livestock production subsidies that previously formed part of the total income of the livestock farm, and tended to disguise the real financial position on many livestock farms. For many beef producers, without these production-linked subsidies, they would have incurred net losses. While the Single Farm Payment - a flat rate payment made on an area basis - provides a cushion during the transition from the previous CAP system of production subsidies to a free, unsupported market, reliance on it can only be a temporary expedient, since the SFP is reducing over time and a substantial proportion of it is siphoned off through ‘modulation’ to fund rural development measures that may not directly benefit the livestock enterprises on the farm.

Though cattle prices have been relatively firm during 2008 and into 2009, in some beef systems rising costs have continued to outstrip increases in farmgate prices. The reality is that the marketplace - including the distribution of margins along the supply chain - has not adjusted to reflect the removal of direct production subsidies in a way that ensures a return to producers that adequately covers costs, provides a proper return on capital invested and allows for further investment in the business.

Each year EBLEX carries out a survey of the actual costs of production of English cattle (and sheep) producers across a representative range of production systems. The latest Business Pointers survey covers the 2007/08 financial year. It shows the following results for the overall average and for the top third performing producers in the survey.

Table 1
Profitability in English Beef Production Systems, 2007/08

<table>
<thead>
<tr>
<th>£ per head (rounded to the nearest £)</th>
<th>2007/08</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Lowland suckler herds</td>
<td></td>
</tr>
<tr>
<td>• Net margin excl. non-cash costs</td>
<td>-121</td>
</tr>
<tr>
<td>• Net margin incl. non-cash costs</td>
<td>-278</td>
</tr>
<tr>
<td>Less Favoured Area (LFA) suckler herds</td>
<td></td>
</tr>
<tr>
<td>• Net margin excl. non-cash costs</td>
<td>-163</td>
</tr>
<tr>
<td>• Net margin incl. non-cash costs</td>
<td>-357</td>
</tr>
<tr>
<td>Combined rearer/finisher herds</td>
<td></td>
</tr>
<tr>
<td>• Net margin excl. non-cash costs</td>
<td>-197</td>
</tr>
<tr>
<td>• Net margin incl. non-cash costs</td>
<td>-402</td>
</tr>
<tr>
<td>Intensive cattle finishing</td>
<td></td>
</tr>
<tr>
<td>• Net margin excl. non-cash costs</td>
<td>-63</td>
</tr>
<tr>
<td>• Net margin incl. non-cash costs</td>
<td>-127</td>
</tr>
<tr>
<td>Extensive cattle finishing</td>
<td></td>
</tr>
<tr>
<td>• Net margin excl. non-cash costs</td>
<td>-52</td>
</tr>
<tr>
<td>• Net margin incl. non-cash costs</td>
<td>-154</td>
</tr>
</tbody>
</table>

Source: EBLEX
What these figures indicate is that at the level of net margins ie after variable and fixed costs but before account is taken of non-cash costs, only the top third performing producers in combined rearer/finisher, intensive finishing and extensive finishing systems made what might be termed a ‘profit’. When non-cash costs are included, only the top third performing extensive beef finishers made a profit. The overall average shows consistent negative margins across all production systems.

In a visual form, Figure 11 shows the cost-price gap for one type of beef production system, extensive finishers. This shows that the average farm gate price has not covered the variable and fixed costs of production of the average performing extensive beef finisher over the period in question.

An update by EBLEX of the 2007/08 figures on the basis of estimated data for the period April to October 2008 shows that:

- for average performing intensive and extensive cattle finishers, a negative net margin in 2007/08 was turned into a modest positive net margin per head in the April - October 2008 period, largely due to the higher prices they received for their finished stock (the top third performers substantially improved their position)
- for average performing suckler cow producers in both Less Favoured Areas and lowland areas, significant negative net margins in 2007/08 worsened in the April - October 2008 period, mainly because the cost increases they faced outstripped the increase in the price of calves sold to cattle finishers (the position of the top third performers was also worse)

The marketplace does not provide a return to producers that adequately covers costs, provides a proper return on capital invested, and allows for further investment in the business.

Undoubtedly, there is a great deal of existing technical knowledge that if it were comprehensively applied throughout the industry would make a rapid and important contribution to improving the technical performance and, hence, profitability of beef production. EBLEX uses the Better Returns Programme to communicate and encourage the uptake of existing scientific and practical knowledge to beef producers.

**HOW CAN BEEF PRODUCERS RESPOND?**

Key areas where producers can make technical improvements include the following:

- Spring calving of cows to meet the high feed demand of lactating mothers for feed from less costly grazed grass
- Better control of feeding cows according to body condition to improve fertility and to reduce costs
- Better management of grass and forage
- Effective sward height management and formulation of feed rations for finishing cattle to enable animals to reach heavier carcase weights faster and so reduce overall production costs
- Better management of creep feeding of calves to increase wean weight and reduce the stall in post-weaning liveweight gain
- Breeding strategies that retain hybrid vigour and serve to reduce the herd replacement rate
- Shorter calving periods to achieve better average weaning weights and calf health
- Using higher performance recorded bulls

There is much the industry can do for itself to raise its technical and, in turn, its business performance. But there are limits to the improvements that an industry comprising many thousands of small businesses is realistically likely to make en masse.

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Gross margins indicate the profit per cow before fixed costs and non-cash costs (non-cash costs include the value of unpaid family labour, the rental value of owned land and interest on working capital).
Cattle production is well suited to England’s climatic conditions. Rainfall patterns promote grass growth that is ideal for cattle (and sheep) production, and much of the UK’s grassland is unfit for growing other food crops.

Of the total UK agricultural area of 17.4 million hectares, around 11.4 million hectares (66%) is grassland. Of this, 38% is classified as rough grazing and so is suitable only for grassland (see figure 12).

Grass is grazed by beef cattle mainly during the spring, summer and autumn months. In addition, excess grass is conserved, principally in the form of silage and to a lesser extent hay, to be fed to cattle in the winter. While grass is the main crop for preservation, other crops such as forage maize and whole crop cereals can also be conserved.

As well as grass, beef cattle consume a range of other crops grown on UK farms such as cereals and pulses, as well as waste vegetables that are not suitable for human consumption, and other specialist forage crops such as forage maize, kale and stubble turnips. It is the high proportion of forage in the diets of English beef cattle that gives English beef its distinctive colour and flavour, compared to imported beef from cattle that are often reared on more intensive cereal-based rations in feedlots.

Many farmers now try to grow as much feed as possible for their cattle on the home farm to ensure quality, traceability, and availability and to reduce overall feeding costs. However, imported feeds are often included in cattle diets because they are cost effective and necessary as part of a balanced ration. Common imported feeds include soyabean meal and maize gluten.

Cattle feeds are also sourced from the human food and drink industry where co-products of the production process are recycled and sold as cattle feedingstuffs rather than being disposed of in other ways. These include brewery and distillery co-products, bread and confectionery wastes, as well as fruit and vegetable processing co-products.

The emerging bio-fuel industry has a potential to provide another source of cattle feed, but market forces, including world oil prices, will determine the financial viability of using these co-products in animal feed.

**THE ENVIRONMENTAL CONTRIBUTION OF BEEF CATTLE**

In terms of landscape value one of the most positive aspects of beef cattle farming is the diversity of the crops that are used in the different production systems, and therefore the various types of habitats they create and maintain. Beef production systems vary between and within regions depending on how farmers choose to manage the resources available to them.

The character of our landscapes and the condition of much wildlife habitat depends on the continued viability of livestock farming (CPRE).

As the Government has noted: “Traditional farming methods together with climatic conditions and the underlying geology have produced distinctive and unique regional landscapes”. Fiona Reynolds, Director General, National Trust has said: “Farming plays a crucial role in maintaining the landscape of some of England’s most important upland areas. The Government needs to recognise fully the public value of upland farming which supports wildlife, maintains a rich and varied landscape, provides access to millions of people and underpins a vibrant tourism industry” (2005).

Without the continuation of traditional farming systems in England valuable landscape features, such as historic field patterns and upland patterns of vegetation would be lost. Further, grazing pastures provide a wide range of different habitats due to the diverse management regimes practised...
As Shaun Spiers, Chief Executive of CPRE, has said: "The character of our landscapes and the condition of much wildlife habitat depends on the continued viability of livestock farming." And the RSPB has said: "Extensive beef production – suckler cows on low input grassland – is crucial to the maintenance of many hill and upland habitats" (2005).

The impact of grazing livestock on habitats depends on the species involved. The distinctly different grazing behaviour of cattle compared to sheep means that they have a notably different effect on sward species and soil structure, and are therefore not interchangeable with respect to habitat management. The interaction of grazing cattle and sheep can be a very important factor in land management in a wide variety of situations.

Many sites of special scientific interest (SSSIs) and areas of particular natural importance are managed with grazing cattle in order to preserve their distinctive habitats and species. According to Defra, undergrazing is the main reason for the deterioration of SSSIs in the UK.

**MANURES AND FERTILISERS**

With nitrate vulnerable zones (NVZs) now extending across most of England, nutrient management planning is an essential component of livestock farming.

Farmyard manure (FYM) and slurries are valuable sources of organic matter and most major plant nutrients. FYM in particular is a useful source of organic matter, acting to improve soil condition and structure.

Applications of inorganic nitrogen fertiliser on grassland have been declining steadily since the end of the 1980s, in contrast to its relatively constant application on tillage land over the same period. The 2007 British Survey of Fertiliser Practice found that overall rates of total nitrogen on grassland fell considerably, from 72 kg/ha in 2006 to 65 kg/ha in 2007. This represents the lowest total overall nitrogen rate reported for the whole survey period since 1983.

Phosphate application rates also show a long-term decline on tillage and grassland since the 1980s, with the trend in application on tillage land approximately double that recorded for grassland.

**THE WATER FOOTPRINT OF ENGLISH BEEF**

It has been calculated that approximately 190 litres of water are required to produce 1 kg of saleable beef in the UK. In other beef-producing parts of the world irrigation plays an important role in producing forage crops and consequently substantially increases the amount of water used to produce a kg of beef. Studies suggest that when irrigation is used to provide cattle feed the water requirement for beef production could be between 1,000 and 20,000 litres per kg of saleable beef. According to one source, "the water used by the livestock sector uses 8% of the global human water use. The major part of this is water used for feed production representing 7% of the global water use". The ability of the UK to produce beef without the use of irrigation makes its production system relatively efficient in terms of its water footprint.

Nevertheless water is a scarce resource and the UK beef industry needs to investigate means of improving water productivity to minimise its effect on water depletion. In general, livestock products contain approximately 5 to 20 times more virtual water per kg than crop products. This fact raises important land use issues where water is scarce. However, where grazing land is not suitable for cropping, beef production provides a valuable opportunity for cattle to convert forage into human food.

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4 The various types of pasture include:
- Short term leys - 1-3 year perennial grass crop
- Medium/long term leys - 3-5 year perennial grass crop
- Permanent pasture - continuous grassland over 5 years
- Deferred grazing - where grass is reserved during the summer for grazing later in the autumn and winter
- Underown grass in cereals - where a grass and spring cereal crop are established at the same time in the same field, with the grass crop remaining after the cereals have been harvested.

5 A number of safety margins have been built in to the calculation to account for the approximate nature of the data. In common with most water footprint calculations this figure does not include water falling directly on the land and fueling crop growth but only includes piped water that could have potentially been used elsewhere.


7 The virtual water content of a commodity is the volume of water used to produce it.
Climate Change

Climate change poses two main challenges to the livestock sector:

- **Mitigation** - livestock production is a major contributor to the production of greenhouse gases (GHG) that cause global warming. The industry must therefore examine how it can alter existing practices in order to reduce current emissions.

- **Adaptation** - to be competitive and sustainable and to meet government targets, the industry must develop strategies to deal with the consequences of climate change in the short and medium term.

GHG include carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). The potency and life of these gases vary. Carbon dioxide-equivalent (CO2e) is a measure used to compare the emissions from various GHG based on their global warming potential (GWP) over 100 years. On this basis, CO2 has a GWP of 1, CH4 23 and N2O 296. The three gases behave differently over time because their half-lives vary ie they deteriorate in the atmosphere at different rates. N2O is the most efficient GHG at trapping heat, while atmospheric methane concentrations are increasing most rapidly amongst the key GHG. However, CO2 is generally considered to be the most important GHG because of its very large share of total GHG emissions.

In the UK, agriculture as a whole contributes 7% of all UK GHG emissions, accounting for 37% of methane emissions, 67% of nitrous oxide emissions and just 1% of carbon dioxide emissions. Direct GHG emissions from all livestock species were 3.1% of the UK’s total emissions in 2006 (down from 4.5% in 2005). Of the methane emissions from farming, about 86% comes from enteric fermentation in the digestive systems of animals and 14% from animal waste. Livestock’s contribution to nitrous oxide emissions derives from the use of arable crops for animal feed and fertiliser use on grassland.

But GHG emissions from UK farming have fallen over the last decade (methane emissions by 12% since 1990) as a result, for example, of more efficient uses of fertilisers and minimum tillage techniques. GHG emissions from livestock production are steadily reducing per kg of product as feed efficiency and genetic potential for growth improves. The shrinking national herd and flock sizes also serve to reduce GHG emissions on the supply side. On the demand side, it should be recognised that consumption of imported products needs to be taken into account in calculating the overall contribution to GHG emissions.

It is equally important to bear in mind that in grazing areas of land that cannot be used for other agricultural production purposes, grazing livestock (including beef cattle) help to maintain land that itself stores carbon.

Greenhouse gas emissions from UK farming have fallen over the last decade … those from all livestock species were 3.1% of the UK’s total emissions in 2006, down from 4.5% in 2005.

A lively debate is developing as to the relative contributions of ‘intensive’ and ‘extensive’ livestock production to GHG emissions. Here, it has to be recognised that more extensive systems tend to push up the carbon-equivalent impact of production per unit of animal product through slower growth rates and less efficient digestion in the rumen. The intensive/extensive debate also highlights the clash of policies between reducing GHG emissions through intensification and the environmental/biodiversity agenda that may lead to higher GHG emissions per unit of animal production through extensification.

Differences in climate and geography mean that animal production systems in different parts of the world have both advantages and disadvantages compared with production in the UK. The starkest difference in the carbon-equivalent impact of beef production between countries is mainly correlated to the extent to which production is based on suckler cows. In countries where a high proportion of beef derives from the dairy herd, the carbon equivalent impact per kg of beef is much lower than that in countries where beef production is mainly based on the suckler herd. The main

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6 There are many other chemicals that contribute to the GHG effect. Whilst they exist in small volumes, they are very potent; the worst have GWP of 14,000 (mainly chlorofluoro- and hydrofluoro-carbons).


10 House of Commons written answer 10 July 2007. Methane is a by-product of rumen fermentation and is really a method of removing excess hydrogen from the rumen as complex carbohydrates are broken down into short chain carbon molecules (acetate, propionate and butyrate). Manipulations of the fermentation pathways can reduce methane production. A change from forage to cereals, for example, decreases the amount of methane produced.
reason is that the overhead cost element of the cow in dairy-based systems is attributed to milk production, while in the suckler beef system the full carbon equivalent cost of the cow is spread over those animals directly destined for beef production.

With the decline in the UK’s self-sufficiency in beef production, an issue that should also be considered is the relative impacts or efficiencies - in GHG terms - of consumption of domestically produced beef as against imported beef. In the UK, home-produced beef originates approximately 50:50 from the dairy and beef herds. Since most feasible alternative external sources of beef to meet domestic demand are based on suckled calf production, the net effect of an increasing reliance on imports is most likely to be an increased carbon equivalent cost of each kg of imported beef consumed.11

Researchers at Cranfield University have calculated the carbon equivalent cost of producing a range of agricultural commodities. These are shown in Table 2.12

The carbon equivalent impact of beef production is relatively high because the embedded costs of the crops needed to feed the animals are included in the calculations.13

As for all sectors of agriculture - indeed for all economic sectors generally - there are important issues about how to mitigate the carbon equivalent impact of beef production and how to adapt to the expected impacts of climate change on the UK.

PRACTICAL ACTIONS TO TACKLE CLIMATE CHANGE

Mitigation

- Research into the development of forage varieties that encourage more efficient utilisation of grass and clover species
- Knowledge transfer programmes to improve grassland management and nutrient management
- Improved genetics in order to increase the efficiency of production animals

Adaptation

- Research into the improvement of forage varieties and alternatives, such as maize, chicory, and drought-resistant grasses and clovers

In response to the climate change challenge, EBLEX is leading an industry ‘roadmap’ initiative to plot the environmental impacts, including carbon impact, of beef (and sheep meat) production through the on-farm production and processing stages, and to provide guidance on how producers and processors can reduce these impacts. The complexity of beef production, with its twin sources of calves (beef and dairy herds) and its multiple finishing systems, means that this task needs to be approached carefully and thoroughly in order to make its findings relevant to all beef producers. The steering group for this work draws from all parts of the industry, from production to retail, and intends to ensure that the outcome of this exercise is a comprehensive and realistic roadmap.

EBLEX is leading an industry initiative to plot the environmental impacts of beef production and to provide guidance on how producers and processors can reduce these impacts.

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11 It should be recognised that a full assessment of the relative carbon equivalent costs of domestic versus imported beef is dependent on assumptions about and analysis of land use changes in countries from which imports may be sourced.

12 Defra project IS0205, ‘Determining the environmental burdens and resource use in the production of agricultural and horticultural commodities’.

13 The figure in the table assumes 50:50 dairy beef dams. The figure would be higher if the suckled beef component were higher relative to the dairy component.

Table 2
Global Warming Potential of a Range of Agricultural and Horticultural Products

<table>
<thead>
<tr>
<th>Product</th>
<th>GWP Kg of CO₂e per kg (over a 100yr period) per tonne of product (except for eggs and milk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread wheat</td>
<td>520</td>
</tr>
<tr>
<td>Oilseed rape</td>
<td>1,200</td>
</tr>
<tr>
<td>Potatoes</td>
<td>460</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>7,000</td>
</tr>
<tr>
<td>Beef</td>
<td>13,000</td>
</tr>
<tr>
<td>Pig meat</td>
<td>6,500</td>
</tr>
<tr>
<td>Poultry meat</td>
<td>3,100</td>
</tr>
<tr>
<td>Sheep meat</td>
<td>19,000</td>
</tr>
<tr>
<td>Eggs - 12,000 eggs</td>
<td>5,400</td>
</tr>
<tr>
<td>Milk - 1m³</td>
<td>1,400</td>
</tr>
</tbody>
</table>

Source: DEFRA
Nutritional Issues

Current Government advice on healthy eating considers lean beef, consumed in moderation, to be an important part of a healthy balanced diet. The nutritional advantages of including beef as part of a balanced diet are many and varied. In moderate amounts, together with starchy carbohydrates, plenty of fruit and vegetables, and moderate amounts of milk and dairy products, lean beef can provide many of the essential nutrients we need for good health and well being, as well as healthy growth and development in children.

Beef has a high nutrient density; in other words it contains a wide variety of nutrients in useful amounts. It contains high quality protein and important vitamins and minerals, some of which are lacking in the diets of certain population subgroups. For those who choose to eat it, beef has many nutritional benefits and these are demonstrated by various dietary surveys.

The Government’s target is average consumption of red and processed meat dishes of 90g per day.

Lean beef is an important part of a healthy balanced diet as a valuable source of iron and zinc, trace elements, a range of vitamins and high quality protein.

MINERALS, VITAMINS AND PROTEIN IN BEEF

Beef is an important source of minerals and trace elements, in particular iron and zinc, as well as selenium and copper.

With concerns about iron deficiency in some groups of the population (notably pregnant women, pre-school children and teenage girls), a number of studies have confirmed the positive effect of including red meat in the diet on intakes of dietary iron. Beef and beef products are a rich source of iron (lean stewed mince contains on average 2.3mg of iron per 100g). They contain haem iron, which is readily absorbed in the body, and they also promote the absorption of non-haem iron from other foods (eg in green leafy vegetables) when eaten together. Overall, meat and meat products (including beef) provide 17% of total dietary iron intake (13 - 14% in 4 - 19 year olds).

Beef is an excellent source of zinc (the average zinc content of 100g of trimmed lean beef is 4mg). Like iron, beef in the diet facilitates zinc absorption. And as with iron, there are concerns about zinc deficiency in some groups, notably young girls. Overall, meat and meat products (including beef) provide 34% of total dietary zinc intake (30 - 31% in young people).

Beef is a valuable source of a range of B vitamins and vitamin D.

It is also a source of high quality protein, which means it supplies all of the essential amino acids, or building blocks of protein, that the body needs to build, maintain and repair tissue. A growing body of scientific evidence suggests that eating more protein can benefit weight loss, muscle mass maintenance, cholesterol and triglyceride levels, and satiety.

FAT

The meat industry has successfully worked to reduce the fat content of red meat, including beef, through selective breeding and animal feeding practices, as well as changing butchery techniques. The fat content of full trimmed beef is 5%. Data from the British National Diet and Nutrition Surveys show how little fat that beef and beef products contribute to the diet: 2% among young people, 4% among adults and 3% among elderly people of total fat intake.

While beef contains some saturated fats, this is less than half its total fat content. The remaining balance is a mixture of unsaturated fats, including monounsaturated fat that is also found in olive oil, n-6 polyunsaturated fats that are cardio protective, and conjugated linoleic acid that research suggests may have beneficial effects, such as tumour-reducing properties and delaying the onset of diabetes.

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14 Eg Gibson and Ashwell (2003)
The English beef industry faces serious challenges on several fronts – technical, economic, financial and environmental.

There are certainly areas where the industry itself can do more to improve its performance:

- through the greater take up of best farm management and husbandry practices communicated through knowledge transfer activity;
- through more attention by producers to achieving cost efficiencies;
- through better marketing;
- through training and skills development;
- and, where appropriate, through greater collaboration with other farmers.

Overall, production standards are high in this country, including high food safety and animal welfare standards, with good adherence to the strict requirements of a wide range of rules and regulations. Livestock producers have a strong respect for the natural environment, and they play an important role in its maintenance.

The eating quality of our beef - notably tenderness and flavour - is high overall, though the industry recognises that there is some variability that needs to be tackled. Demand for beef is robust, though, more recently, under the impact of the economic downturn on the pattern of beef demand, there is evidence of some switching to cheaper cuts.

Yet the beef industry is in trouble. Even with strong cattle prices in recent months, profitability - even amongst the very best producers - is low (indeed, the ‘average’ producer continues to make a loss) as costs continue to exceed farmers’ returns from the marketplace. The result is a lack of business confidence and low investment. The clearest symptom of this is the continuing fall in both the dairy and suckler breeding herds - the ‘seed corn’ of the beef industry.

In general, a convoluted and far from transparent beef supply chain continues to operate in a way that:

- fails to engender meaningful and trusting commercial relationships along the chain;
- fails to share margins in a fair way;
- and that fails to build confidence and so ensure the long-term viability of a sustainable domestic supply base.

The short termism of key players in the beef supply chain, combined with the apparent lack of awareness on the part of policy makers and the public of the steady attrition of the beef industry, means that we are sleep-walking towards the irretrievable decline of a part of our farming industry for which Britain is renowned.

Policy makers and the food industry must take a more strategic view of the domestic industry and the place of English beef in the marketplace.