

Section 1

The Significance of Beef

by Kevin Hanrahan



Introduction

The Irish beef sector currently accounts for over 30% of the value of Irish agricultural output at producer prices. The only other sector of Irish agriculture of a similar size is the dairy sector. In 2010 there were over 79,000 farms with suckler cows according to the Census of Agriculture, and over 90,000 farms had beef cattle on their farm. The beef output of Irish farming provides the key input to the Irish meat processing industry. In 2014 the Irish meat processing employed over 13,000 people.

- ① Can the beef sector meet the targets set out in the Food Harvest 2020 report?
- ② How important is Ireland as a beef exporter?

The Significance of Beef

① Can the beef sector meet the targets set out in the Food Harvest 2020 and Food Wise 2025 reports?

The Food Wise 2025 report has no specific targets for the beef (or other) agricultural sub-sectors, in this context the Food Harvest 2020 target of 20% growth is still relevant.

Growth in cattle prices has meant that the value of Irish cattle sector output in 2015 was over 50% higher than during the FH2020 base period (2007-2009). However, given current medium-term projections for cattle prices in the EU the dramatic growth in output value of the Irish cattle sector of the last 10 years is unlikely to be repeated.

Projections generated using the FAPRI-Ireland model and presented in Figure 2 suggest that over the period to 2024 the value of Irish cattle output is unlikely to grow significantly. The impact of a projected contraction in the suckler cow herd on Irish beef production is expected to be offset by dramatic growth in the progeny of dairy cows that enter the beef supply chain. By 2024 Irish beef production is projected to be largely unchanged when compared with the average of the period 2012-2014.

Figure 1: Cattle Output Value 1995-2015

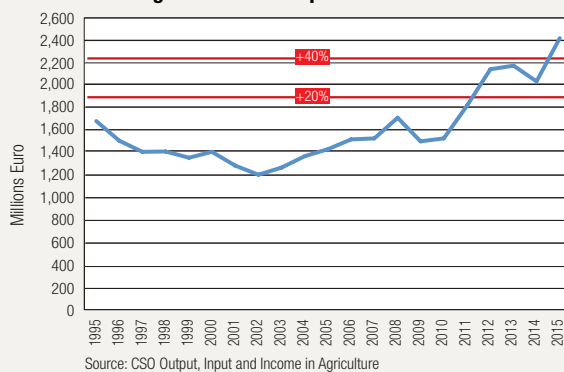
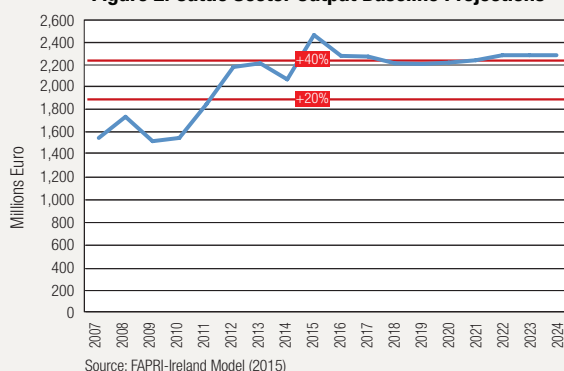


Figure 2: Cattle Sector Output Baseline Projections



② How important is Ireland as a beef exporter?

In 2014 Ireland was the 6th largest exporter of beef in the world (see Figure 3) and the 5th largest beef producer in the EU. The Irish beef sector is extremely export dependent with over 90% of production exported in 2014, with the overwhelming majority of this beef was exported to the EU market.

Within the EU roughly half of Irish beef exports are shipped to the UK with other exports destined for continental EU markets. Live exports of cattle continue to provide an important outlet for Irish cattle farmers.

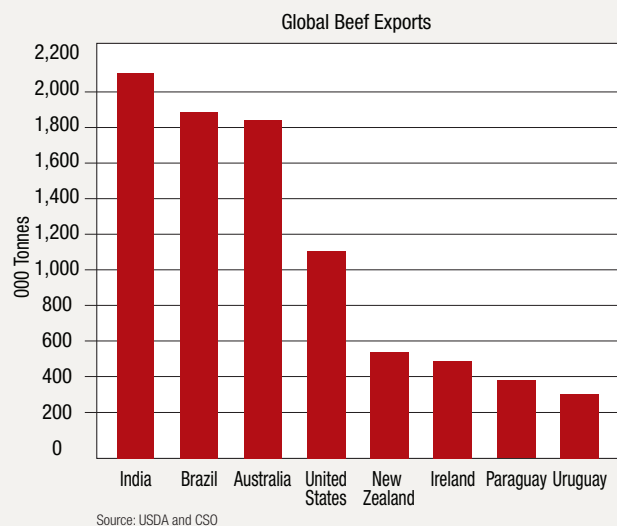


Figure 3: Global Beef Exports 2014

Despite recent convergence between US and EU cattle prices, Irish cattle prices are likely, in the near to medium term, to remain significantly higher than those on the world market. In the event of any lowering of the levels of tariff protection that EU beef markets currently enjoy, such as might result from a free trade agreement with any of the major world exporters of beef, the ability of Irish beef to compete on EU and world markets will depend on the ability of the industry to develop a product offering that is differentiated from the commodity beef product offered by competitors. Within the EU market the comparative advantage of Irish beef production is based on the lower cash costs of production that are a function of Ireland's largely grass-based production systems. Marketing of Irish beef may increasingly depend on this grass-based production system and its associated environmental benefits.

Section 1



How competitive is Ireland as a beef producer?

by Fiona Thorne, Kevin Hanrahan and Anne Kinsella



Introduction

Comparison of costs of production and output value provide us with an indication of the competitive strengths and weaknesses of the Irish beef sector. It is important to remember that competitiveness is about surviving in the marketplace and not always about being the best in the world.

- ① How do we measure competitiveness?
- ② How do Irish beef farms measure against EU competitors?
- ③ How do Irish beef farms measure up at a global level?
- ④ What are the main factors affecting our relative competitiveness?

How competitive is Ireland as a beef producer?

① How do we measure competitiveness?

Comparing the economic performance of beef farms in Ireland with beef farms in other countries is quite complicated because we need to take account of specific factors that exist in each country, e.g. differences in types of feed used, beef products produced, beef prices, labour costs, land rental, etc. To address these challenges we use financial data based on a common accounting standard from the Teagasc National Farm Survey and other EU and non-EU data sources.

② How do Irish beef farms measure against EU competitors?

Costs and returns in Ireland and a number of key competitor countries were examined, namely France, the UK and Germany (Figure 1).

- On a cash cost relative to output value basis, Ireland is similar to the average of all countries examined.
- However, when considering the longer run competitive position the costs of the farmer's own labour, owned land and owned capital must be taken into account.
- When the full economic costs of farming are taken into consideration, including a payment to the beef farmer for his owned land, labour and capital, the average sized Irish beef farm would be considered to be a high cost producer in an EU context.
- The lack of competitiveness when full economic costs are considered is due to land and labour costs that are particularly high in Ireland when compared to competing beef producers in the EU.

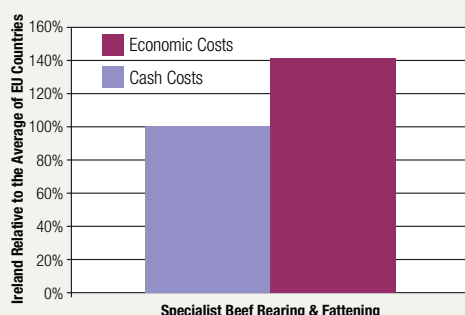


Figure 1. Competitiveness Indicator in the EU:
Costs as % of Output Value

③ How do Irish beef farms measure up at a global level ?

- Ireland was also compared with a number of competitor countries around the world, namely Argentina, Brazil, the USA and Australia.
- Comparing an average beef finishing and rearing farm in these countries on a cash and economic cost basis, Ireland is amongst the highest cost producers internationally.
- While prices for finished beef animals in Ireland are among the highest in US\$ terms among the countries examined this price is not enough to offset the comparatively high costs of producing beef incurred in Ireland.
- However, the presence of decoupled direct payments in Ireland currently provides a 'cushion' to Irish farmers that offsets the on-average negative market based gross margin incurred in producing beef. Such direct income support is, in general, not available to the other non-EU beef farmers considered.

④ What are the main factors affecting our relative competitiveness?

While the average-sized Irish beef farm is competitive in EU terms when only cash costs are considered, if a return is given to the beef farmer for the owned resources invested in the business (time, land and capital), the competitiveness outlook is not positive relative to EU competitors. With this background, what could be considered as the main strengths, weaknesses, opportunities and threats to the competitiveness of the Irish beef sector?

Strengths

- Environmentally-sustainable grass-based system of production with relatively low cash costs when compared with EU competitors;
- Grass based production system more resilient in face of adverse movements in concentrate feed prices;
- Low carbon emissions per kg of beef carcass produced;
- Disease-free status in relation to FMD (Food and Mouth Disease) in particular.



Weaknesses

- High labour and land rent costs in Ireland underly the high total economic costs of beef production relative to EU and international competitors;
- Relatively low stocking rates, labour productivity and capital productivity on Irish beef farms contribute to the relatively high total economic costs per unit of output in Ireland;
- The size of the average farm is insufficient to fully exploit scale economies in beef production;
- The beef sector in Ireland is vulnerable to the effects of low beef prices in periods when EU beef commodity prices fall due to the highly export-focused nature of the Irish beef sector.

Opportunities

- Capacity to increase productivity as size of the average farm increases and economies of scale can be exploited;
- New market opportunities in EU markets post milk quota as less competitive EU dairy farms produce less due to high-cost production systems. Given that a large proportion of EU beef production is produced from dairy cows, any reduction in dairy cow numbers in a reduced price scenario could potentially provide an opportunity on EU beef markets;
- Irish beef farmers need to remember that competitiveness is not always about being the best in the world but about being better than the least competitive competing beef farmer.

Threats

- In the longer term, full economic costs must be evaluated. On a full economic cost basis, Irish beef farmers are not competitive when compared with key EU or wider international competitors;
- Exposure to increased volatility on world markets which is expected to grow in the future;
- Any increases in Irish beef prices over the medium term are expected to be matched with increases in input prices, particularly feed, fuel and fertiliser, with little change in levels of underlying profitability;

- In the medium term, the future direction of direct payments within the EU is of vital interest to Irish beef farmers, who need direct payments to make a positive family farm income on an annual basis;

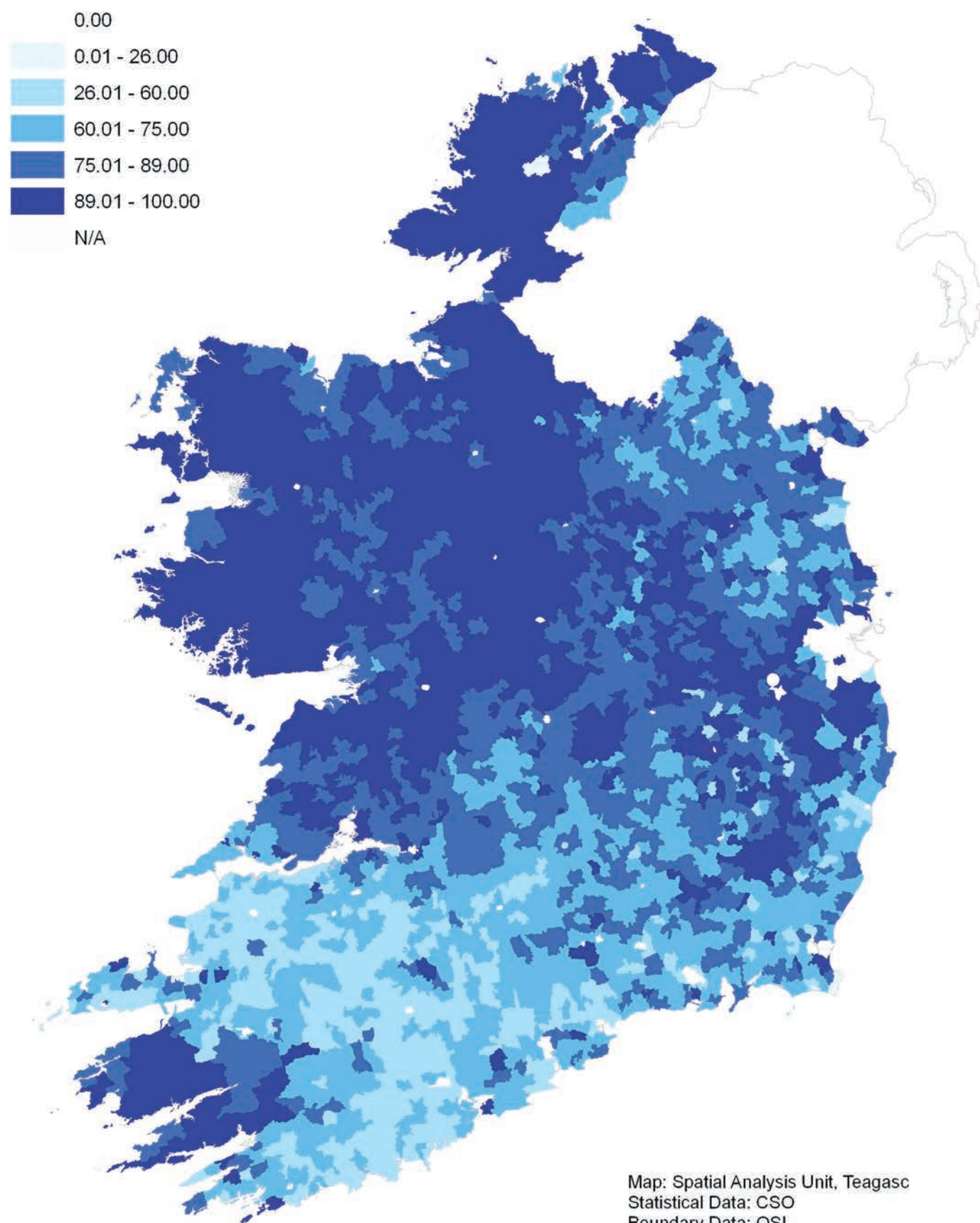
If the CAP budget falls then all farmers will get less support. Furthermore, if direct payment support is 'flattened' those with the highest levels of support per hectare will lose - and those beef farmers tend to be the more intensive farms producing more per hectare;

- In the longer term, a major threat to the future viability of the Irish agricultural sector is likely to emanate from environmental policy reform. The need to meet our environmental commitments while protecting the economic sustainability of beef farming in Ireland will prove challenging.

Conclusions

Overall, economic research highlights that Ireland has comparatively high land rental and labour costs – these are a significant handicap in competitiveness terms. The continued presence of decoupled direct payments provides Irish beef farmers with a 'cushion' which enables them to withstand negative market based margins, these income supports are generally not available to beef farmers in some of the important beef producing regions internationally.

Cattle (non-dairy) as percentage of total Electoral Division Livestock Units



Section 1



Structure of the beef farming sector in Ireland

by Thia Hennessy and Brian Moran



Introduction

Of the 139,000 farms that exist in Ireland, over 100,000 of them have some form of a cattle enterprise. The Teagasc National Farm Survey represents a cohort of more commercial farms, totalling approximately 80,000. Of those 80,000 farms over 73,000 have some form of cattle enterprise with just over 40,000 specialised in cattle production.

- ① What are the most common beef systems?
- ② How do the best farmers compare with the average in suckler beef production?
- ③ How do the best farmers compare with the average in finishing cattle?

Structure of the beef farming sector in Ireland

① What are the most common beef systems?

Table 1: Description of cattle enterprises

Beef System	Number of Farms
Suckling (to weanlings)	10,459
Suckling (to stores)	10,308
Suckling (to finished)	7,218
Finishing (store to finished)	14,900
Calves reared on dairy farms	15,700
Mixed production systems	14,915

Source: Teagasc National Farm Survey

② How do the best farmers compare with the average in suckler beef production?

There are approximately 30,000 farms with a suckler cow enterprise represented by the Teagasc National Farm Survey and the majority of these rear calves to weanlings or stores and then sell them on for finishing. Only about 25% of suckler cow farmers rear calves to finished animals.

Table 2 presents economic details from 2014 on the various production systems operated by single suckling farmers, i.e. selling progeny as weanlings, stores or finished animals. On average, gross output and gross margin is highest on the farms where progeny are reared to finishing. Typically these farms have a higher stocking rate and better soil quality.

Table 2: Variation in gross margin per hectare by production system in 2014

	Weanling	Store	Finishing
Percentage of farms	37	37	26
Stocking rate (livestock units per hectare)	1.16	1.39	1.71
Percentage of farms on very good soils	42	39	55
Gross output (€/hectare)	727	771	1021
Total direct costs (€/hectare)	419	433	655
Gross margin (€/hectare)	308	338	366

Table 3 summarises results for suckler farms classified on the basis of gross margin per hectare; the top performing 10% of farms are compared to the average of all farms. The top 10% of suckler farms achieved a gross margin of €792 per hectare compared to an average of all farms of €338.

Key fact

The direct costs of production of the top 10% of farms are only 22% higher than the average farm, despite the gross output being 68% higher.

Table 3: Profit and performance of the top 10% of suckler farms and average for all suckler farms 2014

	Top 10%	Average
Stocking rate (livestock units per hectare)	1.89	1.38
Percentage of farms on very good soils	77	50
Gross output (€/hectare)	1,385	824
Total direct costs (€/hectare)	593	486
Gross margin (€/hectare)	792	338
Percentage of farms achieving Teagasc Road Map Targets		
Gross output: >€887 per hectare	100	34
Gross margin: >€377 per hectare	100	41

The Teagasc Road Map for beef production has set performance indicators for the sector for 2020. Table 3 also shows the percentage of farms that achieved a selection of these targets in 2014.

③ How do the best farmers compare with the average in finishing cattle?

There are approximately 26,000 specialist cattle farms on which cattle finishing is the predominant enterprise. In 2014 the average family farm income on these farms was approximately €13,300, reflecting all farms sizes and including part-time farms.

Almost 700 cattle finishing farms generated a family farm income of €50,000 or more in 2014. Table 4 summarises profit and performance results for cattle finishing farms, comparing the top 10% of farms to the average.

The top 10% of cattle finishing farms achieved a gross output of €1,781 per hectare – almost twice the output achieved on the average of all farms. This is driven by significantly higher stocking rates on the top farms. However, the natural advantage of the top farms should be noted with 97% of them operating on very good soils compared to only 65% of all farms. Data on cattle sales and purchase prices reveal that the top farmers tend to buy weanlings at lower prices than average and sell finished animals at higher prices, suggesting they are finishing heavier and/or superior animals.

Table 4: Profit and performance of the top 10% of cattle finishing farms and the average for all cattle finishing farms 2014

	Top 10%	Average
Stocking rate (cows per hectare)	2.1	1.53
Percentage of farms on very good soils	97	65
Gross output (€/hectare)	1,781	948
Total direct costs (€/hectare)	796	634
Gross margin (€/hectare)	984	314
Percentage of Farms Achieving Teagasc Road Map Targets		
Concentrate usage: 438 kg or less per livestock unit	55	61

The Teagasc road Map for beef production has a performance indicator relating to concentrate feed usage for the cattle finishing sector. Interestingly, the top group of farmers use more concentrates than the average. This suggests that the additional output they are achieving is offsetting the costs of the additional concentrate feed.





Lot No.	732
No. Animals	1
Average Kg	680
Export	N
Oldest DOB	16-02-2009
Youngest	16-02-2009
TB. Test Date	05-04-2012
Bru. Test Date	06-07-2012
Ring 2	186C
Ring 3	N/A

DEM Weighing Systems, 045 874333

DEM Weighing Systems
1100 kg



Section 1

Beef Marketing

by Joe Burke, Bord Bia



Introduction

Following the abolition of EU milk quotas in 2015, the national dairy herd is undergoing a period of significant expansion. Many Irish dairy farms who previously reared their surplus calves are now likely to sell them, presenting opportunities for Irish drystock farmers and the wider beef industry. Regardless of the origins of their animals (dairy or suckler herds), it is important for producers to be informed on the requirements of the increasingly discerning European beef market.

- ① How significant are Irish beef exports?
- ② How important is the suckler herd?
- ③ Can the dairy herd act as a source of prime beef?
- ④ How much influence does sire choice have on calf price?
- ⑤ Quality: What is the market looking for?
- ⑥ Should I produce steers, young bulls or heifers?
- ⑦ Is there room for breed specific beef programmes?

3 Can the dairy herd act as a source of prime beef?

Across Europe, more than two thirds of the animals raised for beef originate from dairy, as opposed to suckler herds. In Ireland, CAP support payments introduced in the early 1990's were successful in growing the suckler herd to exceed the dairy herd. However, with the removal of EU milk quotas, the Irish dairy herd is currently undergoing significant expansion, while the suckler herd remains stable at just over 1 million head.

Animals from the dairy herd tend to have poorer conformation and kill-out % in comparison with progeny from the suckler herd. However, dairy-bred cattle have the potential to deliver impressive margins at farm level, and they represent a source of quality prime beef for the processing sector.

From a sustainability perspective, dairy beef tends to have much lower greenhouse gas emissions, or Carbon Footprint, than suckler beef.

Live exports: an important market outlet

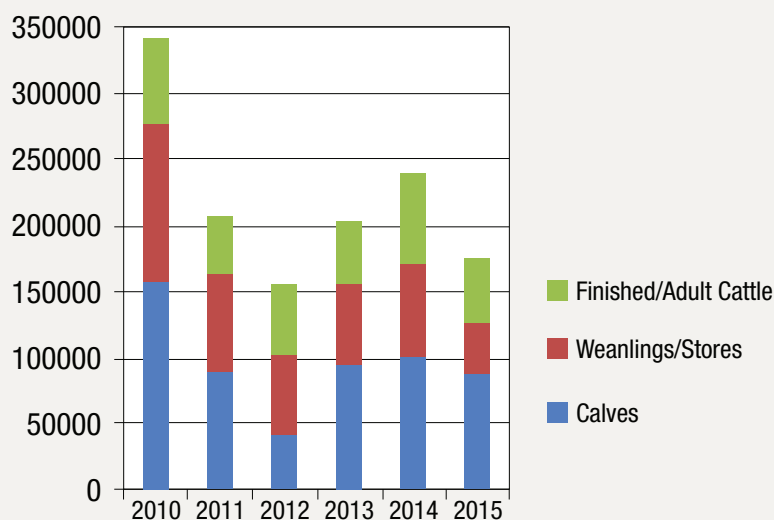
Live cattle exports represent a significant market outlet and source of competition for certain categories of stock, particularly for male dairy calves, as well as high quality weanlings from the suckler herd.

In certain years, a large proportion of the dairy bull calves are exported live to markets like the Netherlands, France and Spain, where they are finished either as veal or light beef carcasses.

Under EU export regulations, calves need to be a minimum of 15 days old before they can be exported. Calves aged between 15 and 35 days are of most interest to export buyers. The younger, lighter, calves usually go to the Netherlands for veal, while the slightly older and stronger ones typically go for young bull production in Spain. Holstein-Friesian bull calves make up the vast majority of Irish calf shipments. Crossbred calves with any Jersey influence are not popular among the key export markets on account of slower growth rates, poor feed conversion efficiency and reduced kill-out percentages.

Calf exports in 2015 reached over 85,000 head, which represented a 16% decline on the previous year. In 2010 almost 160,000 calves were exported: the highest number in recent years. Export demand is influenced by a number of factors including the prevailing beef or veal price, cost of milk replacer / feed and availability of calves in other countries like Germany and Eastern Europe. Disease-related issues can also be a significant factor, with Belgium recently implementing an IBR control programme, thereby restricting Irish exports to that market.

Live Cattle Exports 2010 - 2015



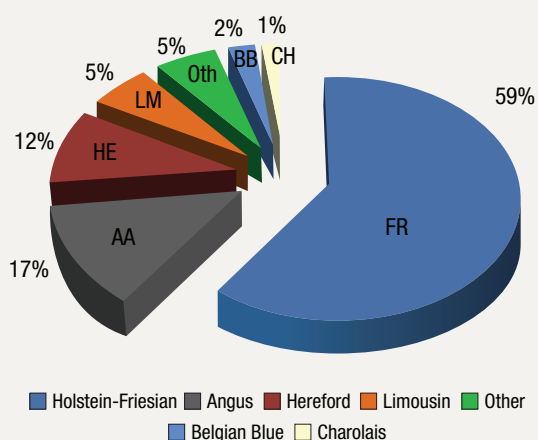
Beef Marketing

④ How much influence does sire choice have on calf price?

The supply of dairy calves is highly seasonal, with over 80% born in the first four months of the year. Almost 60% of dairy cows and heifers are currently being inseminated to Holstein-Friesian bulls. While there is also a very small usage of other dairy breeds, the majority of the remaining cows are generally crossed with beef sires. Angus and Hereford are the most popular beef breeds for crossing with dairy, followed by Limousin.

Beef bulls are mainly used at the end of the breeding season, leading to a greater availability of these calves in April/May. Dairy producers should remember that crossing with beef breeds can significantly increase returns from calf sales. Bulls should be carefully selected for ease of calving and short gestation, along with calf quality.

Sire Selection for Dairy Dams (2015)



Average prices paid for male Holstein-Friesian calves: 2011-2015

Year	2011	2012	2013	2014	2015
Average Price of Male H/F calf (€/hd)	€145	€166	€109	€95	€123

Calf prices can vary significantly from year to year (See table). However, better quality calves consistently command a price premium over plain or poorly presented calves. Clean, healthy calves that are off to a good start are most sought after, whether for the home market or the export trade. Under-fed or poorly bedded calves are more likely to develop scours, pneumonia and navel infections.

The extra value paid for beef cross calves over Holstein-Friesians also remains quite stable. The Table below summarises the average price paid for male and female calves of each the major breeds.

Summary of calf prices from the dairy herd by sire breed for 2015

Breed	Sex (M/F)	Average Price Paid
Holstein-Friesian	M	€123
Angus	M	€225
Hereford	M	€273
Limousin	M	€276
Belgian Blue	M	€382
Angus	F	€203
Hereford	F	€251
Limousin	F	€256
Belgian Blue	F	€336





5 What kind of beef does the market want?

Good economic returns are dependent on having a properly planned production system. For all systems, it is essential that market specifications be established in advance and properly understood. (Teagasc has produced a manual on Beef Production System Guidelines and this is a very useful reference point for producers. It is available on the Teagasc website: http://www.teagasc.ie/publications/2015/3712/109311_BeefProdSystemGuide_10_a.pdf or through the Teagasc advisors.)

In recent years, the European beef market has become more discerning, especially where the higher-value steak cuts are concerned. Our major retail and foodservice customers have defined buying criteria with regard to weight range, class of animal (heifer, steer or young bull), age at slaughter, fat cover and conformation.

Feedback from Bord Bia's regular meetings with buyers confirms that Irish beef enjoys an excellent reputation. This is a testament to Ireland's provenance as an unspoilt natural environment: ideal for grass-based beef production. Bord Bia's Quality Assurance scheme, which includes more than 45,000 Irish beef farms, is further evidence of a major commitment to food safety, traceability, animal welfare and environmental management.

Very few customers will buy all of the beef coming from an individual carcass. More typically, the cuts may go to numerous different customers in several different markets once de-boned. For example, a batch of carcasses might end up as topside, silverside and flank for UK, rib for France/Belgium, fillet and knuckle for Spain, rump for the home market, chuck for Holland, LMC and blade for Italy, VL's for Sweden and so on. It depends on the carcass specification, the time of year, promotions that may be taking place, availability of domestic beef and consumer spending power in the respective markets.

Production systems should enable beef which meets the requirements of most of our important markets. The UK accounts for over 50% of Irish beef exports.

In general, the specification required by the major UK retailers is steer and heifer beef, farm quality assured, from animals aged less than 30 months, carcass weight 280 - 400kg, conformation 'O=' or better and fat class 3, 4- or 4=.

Young bull beef is also acceptable to the UK retail market,

but only from animals finished under 16 months. Retailers in the Irish market tend to have similar requirements to their UK counterparts, although they tend to favour heifer beef over steers.

For the continental markets, there is a wider variation with regard to the specifications demanded.

Italy was historically a strong market for young bull beef from Ireland. Unfortunately, this trade has been more price-competitive in recent years, as consumer demand remains impacted by their economic difficulties. The Italians tend to favour beef which is similar to their domestically produced product. That is, lean fresh beef with little or no marbling that is bright red in colour, with white fat cover.

Spanish customers tend to prefer smaller cuts from carcasses between 280 and 360kg, light fat cover and conformation 'O=' or better.

In the Netherlands, several retailers have developed an appreciation for Irish steer beef, which they stock in preference to other EU beef. (Typically, their ideal range for carcass weight is between 300 and 400kg, conformation R/U and fat class 3/4-. They expect this to be steer or heifer beef.)

Weight is a big issue

It is important to emphasise that the highest paying customers, in the UK and increasingly across Europe, won't buy steak cuts that they consider too large to present to consumers. Bord Bia has analysed the market value that can be obtained for the 20+ cuts of beef that the carcass is broken down into. For many of these cuts it was found that size had little impact on the resulting market price. However, when it came to the high value steak cuts; the striploin, fillet and ribeye, there was a significant reduction in the market price once they exceeded the preferred weight range.

Customers' preference for more moderate-sized cuts is because they are looking to present consumers with steaks which meet a desired price point. This may be easily achieved from the lighter steak cuts (as in the case of the 320kg heifer carcass below). These cuts may be easily portioned into steaks weighing between 200g and 300g and of a standard thickness. On the other hand, heavy striploins (as from the 460kg young bull carcass below) tend to go for the wholesale market, at a significantly discounted price.

Beef Marketing

Age at finish, carcass weight, fat class and conformation for prime cattle slaughtered in 2015

	Av. Age at Finish (months)	Av. Carcase Wt (kg)
Steers	28.4	357.7
Young bulls	18.6	372.1
Heifers	25.9	314.3

CONFORMATION CLASS					
	E	U	R	O	P
Steers	0.1	11.7	36.9	41.3	10
Young bulls	2.6	44.5	27.0	23.2	2.7
Heifers	0.2	16.9	52.0	27.4	3.5

FAT CLASS							
	1	2-/2=	2+	3	4-/4=	4+	5
Steers	0.9	5.6	7.0	58.9	24.2	2.8	0.6
Young bulls	2.9	20.6	22.1	50.7	3.7	0.1	0
Heifers	0.8	3.2	4.2	44.6	35.6	8.1	3.5

Heifer carcass (R+3=, 320kg)

Produced striploins weighing 6.5kg each

Steaks of ideal portion size and presentation



Young bull carcass (U+2+, 460kg)

Produced striploins weighing 10kg each

Steaks are far too large and heavy

Very limited market outlets



⑥ Should I produce steers, young bulls or heifers?

Steer Beef

The majority of male animals in this country continue to be finished as steers. The UK is the only other major EU beef producer with a sizable proportion of steer beef. From a meat quality point of view, prime steer beef tends to have similar attributes to heifer beef. The Irish beef sector has been successful in extending its portfolio of EU retail and foodservice customers. A key selling point has been Ireland's year round supply of prime steer and heifer beef of consistent eating quality.

Key Fact

It has been clearly shown that younger animals are more efficient at converting feed into liveweight gain and that producers can increase stocking rate by slaughtering animals at a younger age.

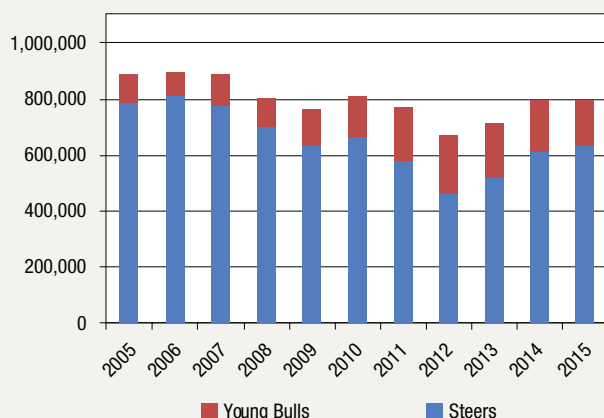
The optimum system of steer beef production in recent years has been finishing at about two years of age. In spite of missing out on the 12c/kg in-spec QA bonus under the Quality Payment System (QPS), a large proportion of steers continue to be finished over 30 months. For example, over 30% of the steers processed in 2015 were aged over-30 months of age at slaughter. This is particularly an issue during the back end of the year, when a lot of spring-born cattle miss the target by just a month or two.

Steers are well suited to a grass-based production system because of their docility. Producers may decide to finish animals at the younger age by feeding more intensively indoors during the second winter. Alternatively, steers can be finished at pasture the following summer. Producers who practice early turnout can achieve impressive results with this system and it is often beneficial for grading and kill-out to introduce a few kilos of concentrate feed 4-6 weeks before slaughter.

Young bulls

In recent years, a considerable number of producers have opted to leave male cattle entire for finishing as young bulls. These systems are quite different to the traditional steer production practiced in Ireland. The popularity of young bull production rose strongly over the late 2000's. Having previously accounted for less than 10% of prime male cattle, young bull slaughterings reached a peak of over 200,000 head in 2012, when they made up over 30% of prime males. However, the number of bulls being finished has been in decline since then, on account of market preferences for a more consistent specification in terms of age, weight and level of finish.

Prime Male Cattle Slaughterings 2005-2015



Producers considering finishing young bulls should be mindful that a high level of management is required. Bulls from the dairy herd in particular have a tendency to be quite active, especially if they become stressed. Robust facilities are required, from housing and handling pens to fencing and water troughs. A period of intensive indoor feeding is required over the final 3-4 months in order to ensure that animals reach the required level of finish, which is generally a minimum fat class of 2+.

Different processors have specific requirements in relation to young bulls. As previously mentioned, young bulls need to be slaughtered at less than 16 months of age in order to meet the specifications for retail customers in the UK market.

Calves born either in early spring or during the autumn tend to be best suited for under-16 month bull production. In many of the processing plants, under-16 month young bulls are paid for on the QPS (Quality Payment System) and are eligible for the in-spec QA bonus once they meet the related criteria. This should be discussed in advance with the intended processor. Excellent feeding management and achieving sufficient fat cover are key components in achieving performance and profitability in this system.

An alternative young bull production system involves slaughtering the animals at between 18 and 20 months of age. This system relates to animals which are finished intensively indoors following a period at grass during their second year.

As mentioned previously, there are market outlets for young bull beef, but there are fewer selling options available for bulls of this age. At times when young bull supplies are high, demand for these animals at meat plants can be difficult, particularly if there is also good availability of steers. Therefore producers undertaking this system should do so in consultation with a meat plant, and with a clear understanding of the desired carcass specifications. As shown in the 2015 slaughter statistics, the average age of young bulls at slaughter in Ireland is close to 19 months. Apart from their age, many of the young bulls finished in this country are too lean (fat class below 2+) or too heavy (carcass weight > 400kg) for many customers' requirements.



Beef Marketing

Heifer beef

Heifers consistently command a price premium (normally 10c/kg) over steers at processor level. On the domestic market, butchers and wholesalers have a preference for heifers. Light heifer carcasses produce primal cuts which are easier for them to sell. Similarly, most heifer beef easily matches the requirements of our retail customers and it performs very well on visual appearance, tenderness and consistency.

The majority of pure dairy female calves are retained by dairy farmers as replacements. Therefore most of the heifers that enter the beef chain are beef crosses. Heifers naturally mature earlier than steers, so they tend to finish at a younger age and a lighter carcass weight. As a result, producers finishing heifers will generally not need to feed as much concentrates. Producers should monitor heifers closely as they come close to finish because they can lay down fat quickly.

With good grassland management some heifers can be finished at 18-19 months, towards the end of the second grazing season. This should be easily achievable with the early maturing crosses. Younger heifers or bigger-framed continentals are likely to benefit from a short finishing period indoors over the second winter.

Another option nowadays for heifers is to consider their potential as a replacement for the suckler herd. There is strong demand for heifers with a good maternal star rating, verified using ICBF data. Beef cross heifers from the dairy herd can make very useful suckler cows if they are bred from a suitable sire, since they tend to have good milk production, fertility and temperament.

7 Is there room for breed specific beef programmes?

There has been considerable success in recent years in the development of several breed-specific beef programmes. This has involved processing companies, breed societies and producers working in cooperation to market beef from Angus and Hereford-sired cattle. Many of the animals processed for these schemes are beef crosses from the dairy herd.

Participating producers receive a price bonus of 12-20c/kg above the 'QPS' base price on qualifying carcasses. These producer price premiums have encouraged a steady increase in Angus and Hereford calf registrations in recent years. The requirements for the bonus are that the animal must be sired by a pedigree registered AA/HE bull, Quality Assured steer / heifer, 240-380kg carcass weight, conformation 0= or better, fat class 2+, 3, 4-, 4= or 4+. It is advisable to pre-book Angus and Hereford cattle in advance to maximise the premiums payable.

There is a positive outlook for these premium ranges, with strong demand from high-end retail and foodservice customers, who are willing to pay more for a quality branded product. Recent feedback from both processors and customers indicates that there will be opportunity to further grow these programmes in the coming years. Until relatively recently, only for a small number of the steak cuts from each carcass were being sold under the value-added brands, while the remainder went into the mainstream conventional market. However as demand has grown a greater range of products are now being marketed and a better carcass balance achieved.



Section 1



Quality beef for the consumer

by Aidan Moloney, Paul Allen



Introduction

Purchasers of beef at all points of the production chain (e.g. factory or retail buyers, processors, restaurateurs, individual shoppers, etc.) are consumers, not just those who actually eat the beef. Beef farmers need to be informed about the preferences of their particular target consumer.

- ① What are the requirements of different consumers?
- ② How do I produce beef that meets those requirements?
- ③ What technologies are being developed to make beef an even better, more reliable product for consumers?
- ④ Is it possible to predict meat tenderness?
- ⑤ How would you develop a payment system that would link the price the farmer receives to the eating quality of the meat?
- ⑥ How does Irish beef compare in terms of quality with beef from other countries.

Quality beef for the consumer

① What are the requirements of different consumers?

- The appearance or colour of beef has an important influence on the decision to purchase beef, either as a carcass or as an individual cut of meat, e.g. some EU markets require carcasses that have white fat and bright red or pink meat colour while individual purchasers generally prefer bright red beef.
- Bord Bia have recognised that while Irish beef has increased market share in the lucrative European market, in future we must have greater access to the higher-value markets which have ever-more stringent requirements, one of which is consistent eating quality.
- The enjoyment that a consumer or customer gets from eating beef is related to its taste or flavour, its juiciness or its tenderness. Tenderness is a critical quality characteristic of beef. If beef is tough, it doesn't matter how good its flavour is, they won't want your beef again.
- Bord Bia recently talked about a "more discerning consumer who prioritises quality, provenance, authenticity and taste".
- The health conscious consumer

② How do I produce beef that meets those requirements?

Colour: fat

The type of ration fed to an animal can change fat colour. This is shown in Figure 1 below where cattle fed a high dry matter wheat silage ration had the whitest carcass fat while cattle finished off grass had the most yellow. In general, to meet a "white fat" specification cattle must not consume green forage in the finishing period.

Colour: meat

Ration type has little effect on meat colour. Age appears to be more important than diet, with younger animals having muscle that is lighter and less red in colour. Cattle that are stressed prior to leaving the farm, during transport and/or lairage, may produce darker muscle. Breed differences seem to be relatively small.

Forage-fed beef maintains its bright colour longer than concentrate-fed beef during retail display, unless extra anti-oxidants such as vitamin E are included in the ration.

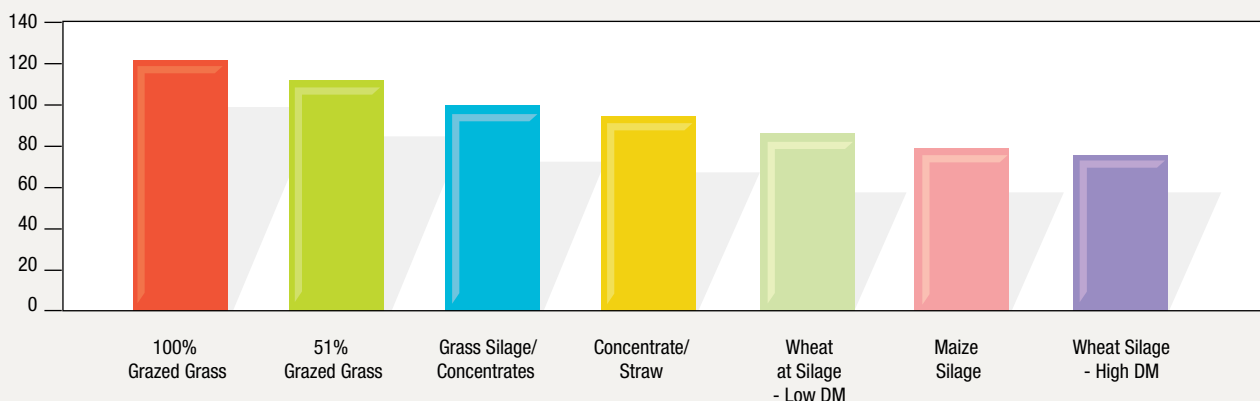


Figure 1. Dietary ingredients affect fat yellowness (grass silage = 100)



Eating quality: Tenderness

Key Fact

The enjoyment that comes from eating beef is greatly influenced by its tenderness.

Checklist

On-farm influences on tenderness:

- The composition of the diet has little effect on tenderness.
- Growth rate before slaughter does not greatly influence beef tenderness.
- When slaughtered at a constant fatness there is little difference between breeds in tenderness.
- The marbling or visible fat in meat explains only a small proportion of the variation in tenderness.
- When cattle are slaughtered at a similar age, there seems to be little on-farm influence on tenderness.
- Beef from older animals tends to be less tender than beef from young animals

Post-slaughter management of the carcass, such as rate of cooling, electrical stimulation and, in particular, ageing/hanging can have a big influence on tenderness. Variation in tenderness can be dramatically decreased by ensuring that all parts of the supply chain are managed well.

Eating quality: Flavour

Consumers are often culturally adapted to a particular flavour profile in the meat that they eat e.g. grass-finished beef is poorly accepted in the USA. Trained assessors can detect a wide range of flavours in meat.

Assessors liked grass and non-grass-fed beef equally well, unlike USA consumers. However, grazed grass resulted in higher “greasy” and “fishy” flavours when compared to a concentrates/straw or a grass silage/concentrate ration. The changes were relatively small and were measured in lean (less than 5% fat) meat. Fatter meat might have more pronounced flavours.

Healthiness

Health and wellness is becoming a big driver of change in consumer markets. Beef is generally recognised as a good source of protein, minerals and anti-oxidants. There is a perception that beef has too much fat and that fat is made up of “unhealthy” fatty acids.

We can produce lean beef in Ireland that has a higher concentration of substances that are beneficial to human health, for example, omega-3 fatty acids. These are fatty acids similar to those found in fish oil and are protective against heart disease.

The health-conscious consumer market can be seen in the array of food products already available which target this market. There is opportunity for beef-based products to capture a share of this market.

Conjugated linoleic acid (CLA), is a fatty acid that has been shown to protect against cancer and other diseases. The concentration of CLA in beef can be increased by increasing the duration of grazing and by the inclusion of specific plant and/or marine oils in the supplementary feed. Thus the nutritive value of beef can be enhanced by manipulating the composition of the ration. This should facilitate the marketing of beef as a food that is more in line with human health requirements.

Quality beef for the consumer

③ What technologies are being developed to make beef an even better, more reliable product for consumers?

Tenderness is the most important quality attribute for beef. Juiciness and flavour are also important but if a steak, or a roast, is tough most people will not enjoy eating it. One of the main things that makes beef tough is rapid chilling immediately after slaughter (called cold shortening). This causes the muscle fibres to contract excessively so the meat never becomes really tender, even after prolonged ageing. The relationship between pH and temperature fall is critical and can be monitored to ensure tenderness.

In the past butchers and meat companies would chill their beef as quickly as possible to reduce weight losses due to evaporation. Today, they use a slow chill for the critical 10-12 hours after slaughter before reducing the chill temperature further.

Applying an electrical current to the carcass shortly after slaughter (electrical stimulation) can improve tenderness but is mainly only of benefit if there is a risk of cold shortening.

Carcasses are traditionally hung by the Achilles tendon but an alternative method of placing the hook under the pelvis (pelvic suspension or aitch bone hanging) is being used by some processors. This improves the tenderness of the loin and hind muscles through stretching them.

Ageing or maturation, that is holding it in a chill for at least 10 and in some cases up to 35 days, leads to more tender beef. This is due to the enzymes present in the meat continuing to break down the muscle fibres. The ageing can take place on the bone (dry ageing), in vacuum pack (wet ageing) or by a combination of both.

Tenderbound is a technology that has been developed at Teagasc Ashtown and has been demonstrated to result in shorter ageing times and increased consistency. This involves removing the more valuable muscles from the carcass within 90 minutes of slaughter and tightly wrapping them in a highly elastic plastic film using a machine called PiVac. Wrapping prevents contraction which is normally excessive for hot boned muscles. Avoiding contraction means that the muscle requires less subsequent ageing.

④ Is it possible to predict meat tenderness?

Worldwide, much effort has been put into developing rapid and reliable on-line methods of measuring meat quality, particularly tenderness. This is because even when carcasses from similar animals are handled in the same way there is still quite a lot of variation in tenderness. Companies would like to be able to sort carcasses into quality classes and price them accordingly. Several technologies have been developed as on-line methods but, as yet, none are accurate enough.

Genetic and biochemical approaches can be used to sort out individual variability and to improve tenderness over time. Genetic markers for tenderness have been identified and will be used in breeding programmes in the future. These and biochemical markers may be used by companies wishing to sort out carcasses with superior tenderness.

In the absence of reliable on-line measurement methods, Meat and Livestock Australia have developed a mathematical model, the Meat Standards Australia (MSA) grading, which predicts the eating quality of individual cuts from the live animal and post slaughter factors that are known to affect eating quality. This model has been tested by Teagasc Ashtown on Irish beef and Irish consumers and has been found to work quite well. Each cut from every carcass gets a “star” rating, with 5-star being the best.



⑤ How would you develop a payment system that would link the price the farmer receives to the eating quality of the meat?

Paying a premium for superior eating quality implies that it can be measured accurately on-line. As already stated, reliable methods are not yet available. The MSA grading model or a similar approach could be used to predict the proportion of cuts in a carcass that are likely to be in each of the quality categories and premium payments could be linked to this.

Another approach is to agree specifications with farmers, such as the breed, sex, feeding system and age and weight at slaughter. Animals that meet these specifications would attract a premium on the basis that the eating quality is likely to be better than average. Such schemes already exist.

In the future when eating quality is included in breeding schemes, a premium may be paid if a bull with a high eating quality score is used or it may be paid for animals with a genetic marker for tenderness.

⑥ How does Irish beef compare in terms of quality with beef from other countries?

Almost 90% of the beef produced in Ireland is exported into highly competitive markets. So its quality, must compare favorably with beef from other sources.

Irish beef has unique selling points which are important for some consumers. Firstly, Ireland has a “green” image with cattle out on rolling hills covered in lush green grass. In the winter they eat mostly grass silage with a small amount of concentrates. The grass diet gives the meat a distinctive flavour and a more healthy fatty acid profile than the concentrate-based diets common in continental Europe and the US.

Secondly, most Irish beef is from steers and heifers, though the production of young bulls has increased in recent years. In some European countries much of the beef comes from cows and young bulls and would generally be of inferior eating quality. Also, Irish processors have adopted the technologies discussed earlier to improve the eating quality of Irish beef.

Key Fact

In general the post slaughter factors have three to four times more effect on eating quality than the live animal factors.



