Soil Association

the heart of organic food & farming

Where's the beef?

How supermarket pricing is holding back UK organic meat production

January 2008

Soil Association
South Plaza
Marlborough Street
Bristol BS1 3NX
T 0117 314 5000
F 0117 314 5001
E info@soilassociation.org
W www.soilassociation.org

Executive summary

On the whole, the multiple retailers have responded well to the aspirations of the Government's organic action plan. They have made good progress towards ensuring that more of the organic food we eat comes from UK farmers. In 2006, two-thirds of organic primary produce sold in UK supermarkets was UK produced, compared to just 30% when the plan was published six years ago.

For some products, however, growth in UK production has stagnated and imports are increasing again. From 2005 to 2006, the proportion of organic red meat from UK producers sold through UK supermarkets fell from 85% to 79%. Imports of beef increased from 15% to 17% of sales and pork from 20% to 47%.

Where's the Beef? highlights the high environmental costs associated with continuing reliance on imports of organic beef and the low farm-gate prices that are severely hampering further growth in UK sourcing.

Focusing on the nearest store to Tesco's UK headquarters in Hertfordshire, the Soil Association has compared the carbon footprint associated with transporting organic beef from Wales and from Argentina to the supermarket shelf. We found that the Argentinian beef clocked up 320.6g in emissions from road and sea freight for a 1.5-kilo joint of meat – more than eight times the 38.5g transport emissions for a similar joint of Welsh beef.

This means that a Tesco customer buying a joint of organic beef from Argentina once a week, instead of a Welsh joint, will typically generate additional emissions in a year that are equivalent to powering an average fridge 24 hours a day for three months or keeping an average television on for an extra four hours each day throughout the year.

University research into farm finances suggests, however, that unfair pricing is undermining the chances of achieving a lasting reduction in imports and the emissions created by them.

Some retailers are paying a little more for UK organic beef than others, and their principled approach should be welcomed in a highly competitive market. But instead of creating the conditions needed to bolster farmer confidence and boost UK production, overall the major supermarkets are collectively failing to pay an average price that is fair and sustainable for UK organic beef producers. Some are also undermining the role that independent livestock producer groups can play in collaborative forward planning to even out supply and meet demand.

The average farm-gate price for organic beef in 2006 was £2.88/kg. This compares with costs of production of £3.32/kg in 2005–2006 – an average loss of 44 pence for every kilo of beef produced.

When low farm-gate prices are considered alongside the cost implications of a tightening of organic feed standards from January 2008 and anticipated subsidy cuts under the Single Payment Scheme, it is not surprising that farmers lack the confidence needed to boost organic beef production to the levels that would support 100% UK sourcing in years to come.

The Soil Association believes that the farm-gate price of organic beef is unfair and unsustainable. It wants retailers to demonstrate their commitment to UK organic beef producers by increasing farm-gate prices by at least 10% in 2008 and forming more long-term partnerships with their UK suppliers.

This report also recommends that those supermarkets that are still relying significantly on imports should make pledges as to the increasing volumes of beef they are prepared to source from the UK in the future, committing to clear targets and a timetable that give farmers the security they need to expand production. Each multiple retailer should commit to a target for the number of animals it will work towards taking for beef from the organic dairy herd.

Together with their processors, retailers should prioritise protecting and restoring supply partnerships with independent producer groups to help redevelop trust and collaboration throughout the supply chain.

Farmers who are not members of independent producer groups should seriously consider joining groups in order to strengthen future UK production through cooperation and help improve the efficient delivery of volume and continuity of supply to the supermarkets.

Introduction

The headline statistics suggest that the UK market for organic food and drink is buoyant. Sales of organic products rose by 22% to £1.93 billion in 2006. [i]

As the appetite for organic food has increased, encouraging progress has been made in ensuring that more of the organic food we consume is produced in the UK. When the Department for Environment Food and Rural Affairs (Defra) published its first Organic Action Plan in 2002[ii], only 30% of organic products purchased by UK consumers were produced in the UK. Today, two-thirds of organic primary produce in UK supermarkets is UK produced, and numbers of UK organic producers have reached 4,639.[iii]

The UK's leading supermarkets and the farmers who supply them deserve a lot of credit for this growth. All the major retailers have significantly reduced their reliance on imports, with Waitrose and Sainsbury's leading the way.

On closer examination, however, cracks begin to appear in this rosy picture. The proportion of UK primary produce on supermarket shelves may be much improved compared with 2002, but it has remained static since 2005. The growth in sales of organic products is far from uniform, with demand for some foods inching forward or stagnating while the market for others races ahead. For some products, reliance on imports is actually on the increase again.

An area of particular concern is red meat. Progress towards UK sourcing has gone into reverse in the past 18 months, and the combination of low farmgate prices and spiralling costs is leading alarming numbers of farmers to question the future financial viability of UK production.

This report examines both the environmental costs of importing organic beef into the UK and the mismatch between costs and prices endured by UK producers.

Unless there is a rethink on pricing, there is a real danger that organic meat production in the UK may be nearing its peak, with the prospect of a further surge in imports supplying the bulk of any future increase in demand.

Falling behind – the slowing of UK organic meat production

Sales of organic meat through UK supermarkets rose by 21% in 2005–06.[iv] But an increasing proportion of this growing demand is being met by imports. In 2005, supermarkets sourced 85% of their organic meat from UK producers. In 2006, this dropped to 79%.[v]

For organic beef and pig producers the figures are particularly worrying. From 2005 to 2006, UK sourcing fell from 85% to 83% in the case of beef and slumped from 80% to 53% for pork. The headage of organic cattle and pigs produced in the UK failed to keep pace with the 21% increase in organic meat sales, increasing by only 13% for beef and actually falling by 10% for pigs. UK organic pig production slumped to just 51,000 animals – the lowest level for three years and below the level of production when the organic action plan was published six years ago.[vii]

In lamb the picture on UK sourcing is relatively positive, with imports diminishing to just 2% of the market in 2006.[viii] Next year is likely to be another of relatively few imports, with Sainsbury's pledging to import no New Zealand organic lamb in 2008. But organic lamb producers are also feeling the kind of severe price pressures that this report highlights in the beef sector. Lamb prices this last autumn were the lowest in real terms since the Organic Action Plan was published. And because beef and sheep are often produced together in integrated systems on organic farms, any dip in beef production is likely to have a negative knock-on effect on the volume of organic lamb produced.

The stark statistics on UK sourcing must bring into question the commitment of some of the leading supermarkets to increasing supplies of organic meat from UK farmers. While Sainsbury's and Waitrose now source all of their organic beef and pork in the UK, the ambivalent approach of some of their rivals means that the market as a whole has become more dependent on imports than it was a year ago.

With demand for most organic products set to increase further in the next few years, there will need to be much stronger support from retailers for UK production if a further increase in import dependency is to be avoided. A report from the Red Meat Industry Forum, for example, has estimated that UK organic beef production will need to double in the next three years if 100% of projected demand for organic beef in 2010 is to be met from UK farms.[ix]

Table 1
Estimated organic red meat production in the UK in the five years since publication of Defra's organic plan in 2002.

Year	Headage of beef cattle	Headage of lambs	Headage of pigs
2002–2003	15,000	160,000	62,000
2003–2004	18,500	150,000	50,000
2004	19,284	158,912	47,000
2005	27,358	205,238	56,487
2006	30,987	290,720	50,777

The hidden costs of imports

Defra has committed itself to promoting and expanding organic farming because of the environmental and social benefits associated with organic agriculture. Its Organic Action Plan acknowledged that organic farming results in higher levels of biodiversity, lower pollution from pesticides, lower energy use and carbon emissions, lower levels of waste, high standards of animal welfare and increased rural employment.[x]

If the UK organic market is supplied predominantly with imported produce, then it is mainly in countries other than the UK where the environmental benefits associated with our organic consumption will be enjoyed. Defra's Organic Action Plan called for support from retailers to increase the UK-produced share of UK organic products to at least 70%, in order to ensure that "consumer demand for organic produce results in tangible benefits for the English countryside and English wildlife, by increasing British farmers' shares of the organic food market."

Import substitution is about more, however, than where the benefits of organic production are realised. Producing organic food closer to the point of consumption offers the potential to reduce food miles and cut the damaging greenhouse gas emissions associated with transporting food around the world.

To explore this area the Soil Association set out to compare the carbon footprint associated with bringing domestically produced and imported organic beef to the supermarket shelves. We focused our comparisons on Tesco, the UK's leading retailer in terms of organic food sales and also the leading importer of organic beef.

Our calculations were based on the routes travelled by meat destined for the Tesco Extra supermarket at the Brookfield Centre in Waltham Cross. This store is just over a mile from Tesco's national headquarters in Cheshunt, Hertfordshire[xi], and is the closest branch selling organic beef if Chief Executive Sir Terry Leahy wants to pop out to buy a joint in his lunch hour.

When it comes to minimising carbon emissions, the ideal for a conscientious organic consumer may be to buy locally produced organic beef from a local farm shop or farmers' market. But organic beef is not sold at any of the five farmers' markets closest to Tesco's Cheshunt offices.[xii] This reflects the situation in many parts of the country, where supermarkets often play an important role alongside mail order as the only options available for buying organic meat.

We found that organic beef produced on a farm near Chepstow that supplies Tesco travels 253.1 miles to reach the Waltham Cross store. This consists of 34.6 miles from the farm to St Merryn Meats in Merthyr Tydfil for slaughter, cutting and packing; 205.9 miles from Merthyr Tydfil to the Harlow Composite (Flex Meadow) distribution centre; and 12.6 miles from the distribution centre to the store.[xiii] During this journey a 1.5-kilo joint of beef clocks up 38.5g of carbon emissions.

We also looked at the route travelled by organic beef produced at Estancia Santa Elena, a ranch in the Argentinian pampas that is part of a producer group called Ecopampa that supplies Tesco. Estancia Santa Elena is in Buenos Aires province – much closer to the capital, where Tesco's organic beef is packed and shipped, than many organic suppliers – but its beef still travels a staggering 8,169.6 miles to reach Waltham Cross.

First comes a journey of 189.5 miles for slaughter at Argentine Breeders and Packers (ABP) in Hughes, then 183.3 miles from ABP to Macellarius in the Buenos Aires suburbs for packing. From Buenos Aires, there is a 7,205-mile journey by sea freighter to Tilbury Docks. From Tilbury the meat travels a further 276.8 miles for retail packing at St Merryn Meats in Cornwall, 302.4 miles from Cornwall to the Harlow Composite distribution centre, and 12.6 miles to the local store.[xiv]

Around nine-tenths of this marathon journey is by sea. A bulk sea carrier produces less than a sixth of the emissions created by a large articulated lorry per kilo of food per mile travelled.[xv] Despite this, transporting the Argentinian beef clocks up 320.6g of carbon emissions overall – more than eight times the emissions associated with the Welsh beef.

These emissions calculations mean that transporting a typical joint of Argentinian organic beef creates 282.1g more carbon emissions than transporting a typical joint of Welsh organic beef. Over the course of a year, a Tesco customer at Waltham Cross buying a 1.5-kilo joint of Argentinian beef each week would be contributing 14.67 kilos more in transport emissions than one buying beef from Wales.

This additional carbon dioxide for just one customer in a year is equivalent to having an average colour television switched on for an extra four hours a day all year, or powering an average fridge 24 hours a day for three months.[xvi]

There are also animal health and welfare issues to consider. A study on organic imports to be published by Defra in 2008 [xvii] will report that Argentine producers routinely use the wormer Ivomec on their cattle – permitted only under exceptional circumstances by Soil Association standards in the UK. Journey times to slaughter of 12–15 hours are not unusual – compared to a maximum of eight hours under UK standards. In exceptional circumstances, the Defra study reports, organic beef cattle in Argentina may have to endure cumulative journeys of as long as 24 hours – three times the limit in the UK.

Table 2
Distances travelled and carbon emissions created by transporting UK produced and Argentinian organic beef to the supermarket shelf.

Journey	Argentinian beef		Welsh beef	
	Miles	CO_2 emissions	Miles	CO_2 emissions
Estancia Santa Elena–Hughes	**189.5**	**28.8g**		
Hughes–Buenos Aires	**183.3**	**27.9g**		
Buenos Aires–Tilbury	**7,205**	**173.9g**		
Tilbury–Cornwall	**276.8**	**42.1g**		
Chepstow–Merthyr Tydfil			**34.6**	**5.3g**
Cornwall–Harlow	**302.4**	**46g**		
Merthyr Tydfil–Harlow			**205.9**	**31.3g**
Harlow–Waltham Cross	**12.6**	**1.9g**	**12.6**	**1.9g**
Totals	**8,169.6**	**320.6g**	**253.1**	**38.5g**

A fair price for farmers?

Analysis carried out by Organic Centre Wales shows that organic producers of both beef and lamb are being paid prices for their animals that fall well short of the cost of production. Farm-gate prices are failing to reflect rising costs, and a survey conducted in April by the Graig Producers marketing group suggests that a significant proportion of livestock farmers are likely either to reduce their organic stock or pull out of organic production in the near future.

Farm-gate prices for organic lamb have risen by just 5% in the five years since the Organic Action Plan was published – a period in which they needed to increase by 13% just to keep pace with inflation. [xviii]

This report focuses, however, on the picture in organic beef production. Farm-gate prices for organic beef have done considerably better than those of organic lamb between 2002 and 2006, increasing by 18%. But data from Organic Centre Wales show that the benefits of such increases are being wiped out by the spiralling costs farmers face. In 2006, the average organic beef price was £2.88/kg. This compares with costs of production of £3.32/kg in 2005–2006 – an average loss of 44 pence for every kg of beef produced.

The £3.32 figure was calculated by adding up costs such as feed, fuel and hired labour and subtracting the value of environmental subsidies and other income. But it takes no account of the unpaid labour of farmers and their families, or the cost implications of interest payable on tenants' capital and the imputed rental value of land. Once these factors are incorporated, with the hours worked being valued at the level of the basic agricultural wage, the cost of production rises significantly.

The disparity between prices and costs varies according to whether farmers are producing suckler calves or finishing organic beef. The biggest losses are currently being incurred by farmers producing store cattle. But the overall picture is the same for all organic beef producers: farmgate prices are quite simply unsustainable.

For the moment producers have a lifeline in the form of the Single Farm Payment (SFP). The SFP was not included as a source of income in the Organic Centre Wales calculations because it is a payment that does not require farming of the holding and is not enterprise related. The SFP is just about enough to tip organic beef production into profitability for most producers.

Farmers are acutely aware, however, that future changes under the Single Payment Scheme will leave most beef producers worse off. Analysis from Defra indicates that the proportions of farms that will receive less in direct subsidies in 2012 than they did in 2004 (immediately before the scheme was introduced) are 55% of livestock farms grazing less favoured areas, 60% of livestock farms grazing the lowlands and 85% of mixed farms.[xix] Beyond 2012, the future of the SFP is uncertain, and further significant cuts in farm payments cannot be ruled out.

Returns for organic beef producers have fluctuated considerably in the five years since the Organic Action Plan was published, and such fluctuations make it difficult for organic farmers to plan production ahead and for non-organic farmers to contemplate organic conversion. When this unpredictability is considered alongside painfully low farm-gate prices, an imminent tightening of the organic feed standards[xx] and anticipated subsidy cuts, it is not surprising that farmers lack the confidence needed to boost organic beef production to the levels that would support 100% UK sourcing in years to come.

"In the past 12 months I don't think any progress has been made towards where the industry needs to be and it's very frustrating," a respected industry analyst told the Soil Association recently.[xxi] "There needs to be a strong signal from retailers in terms of price and in terms of long-term commitment to producers in order to bring about any change. At the moment the price is not high enough to provide any incentive."

Just how serious the crisis of confidence has become is made clear by a survey of 83 producers in Wales, south-west England and the Scottish borders conducted by the Graig Producers marketing group in April.[xxii] This survey found that if feed prices remain high and prices for finished stock remain at 2006–07 levels, three out of ten farmers will reduce their stock numbers to stay afloat and one in 12 will stop farming organically all together. Feed prices have increased still further since the survey was conducted.

Farmers are not powerless to make their cost bases more sustainable. But their options are severely limited by the financial squeeze of low pricing and by the practical limitations of their farms. Feed costs could be reduced if farmers produced more feed on their own farms, but upland and hill holdings are not suitable for growing arable crops.

Such constraints mean that it is the price paid for organic beef – more than any other factor – that will determine whether UK production grows and thrives or withers away. And that means it is ultimately up to the supermarkets and their processors to pay the better prices that are desperately needed to protect the future viability of the UK organic beef industry.

Ironically it is not only UK producers who are feeling the squeeze. Some farmers in Argentina argue that the price they are being paid by UK supermarkets – a price that is contributing to the competitive pressures holding down UK prices – is also unfair and unsustainable. The domestic market for Argentinian organic beef is negligible, they point out. This means that the price paid by supermarket buyers is crucial because any meat not sold for export as prime cuts will end up on the domestic non-organic market without any price premium to reflect higher production costs.

"UK organic producers are being undercut by Argentinian beef but the prices in Argentina are being set by screwing Argentinian organic farmers to the floorboards," says one insider familiar with the industry in both countries. "The beef buyers in Argentina are under real pressure from the UK retailers. The price for organic beef should be higher in both countries."

Competition or cooperation?

Increasing prices may hold the key to ensuring that organic beef farming is viable in the UK in the short and longer term, but it is also important for producers and retailers to cooperate more closely to develop UK sourcing.

It takes two years to convert a holding to organic farming, followed by a further period of up to two-and-a-half years for a new organic farm to produce the first finished beef cattle from its own calves. This means that organic production cannot simply be switched on and off like a tap in line with sudden changes in demand. It takes time for producers to respond to changing demand or to fill the gap left by those leaving the industry, and careful planning and collaboration are needed to draw in new farmers and to even out supply across the year.

Independent livestock producer groups – organisations such as the Organic Livestock Marketing Cooperative, Graig Producers and Caledonian Organics – have played a significant role in coordinating and planning the production of organic meat over the past decade. Supermarkets need the confidence of organic producers to be able to gear up UK production, and confidence is a scarce commodity in the farming community. Distrust of some of the multiple retailers is deeply entrenched. In this context independent producer groups can be a valuable intermediary between farmers, processors and the supermarkets. They are uniquely well placed to encourage more open communication, facilitate good data collection and production planning, work closely with certifiers, build trust through the supply chain and marshal production to ensure that farmers deliver.

It is worrying, therefore, that independent producer groups feel increasingly marginalised by some supermarket processors. It is also a concern that farmers do not join these independent groups in greater numbers.

In recent months some processors supplying the multiple retailers have used the current market surplus of organic lamb as an opportunity to curtail orders through independent producer groups, turning their backs on established supplier partnerships.

"We tend to have good relationships with the processors when they need us because supplies are scarce, but when there's a surplus some of them only want to take product direct from farmers," says a leader of one producer group.[xxiii] "This undermines everything we are trying to do in giving the supermarkets continuity of supply and spreading production over the year."

One leading UK organic pig producer who has lost business this year to Danish imports argues that farmers, as well as processors, need to acknowledge their share of responsibility for the lack of cooperation in the UK supply chain and for the continued reliance on cheaper imported meat. "The processors have an ingrained antipathy to dealing with producer groups because they simply do not like any signs of strength in the primary producer part of the chain," he told the Soil Association. "The only way through is for all UK organic pig farmers to be in the same group, working as one. But egos and culture get in the way."

He also believes, however, that the real power to move UK sourcing forward still lies with the supermarkets. "If Tesco says it wants 75% UK organic pork by the end of 2007 and 95% by the end of 2008 it will happen. You can't have commitment from a producer without the commitment from a retailer to help get there."

Experiences of marginalisation among producer groups echo what has happened in non-organic production, where retailers have increasingly developed their own supply chains and reduced their reliance on producer co-operatives. "As the supermarkets see organic becoming more mainstream, they are uncomfortable with organic sitting outside the arrangements they have for non-organic produce," a senior co-operative figure told the Soil Association. "If there were alternative sources that could be developed without us, they would go down that route for sure."

One respected independent figure who has been involved in strategic discussions between producers and retailers believes that the supermarkets should be working more closely with producer groups, instead of seeking to sideline them. “There needs to be better dialogue with producers, and there’s a real opportunity for retailers and their suppliers to make more use of producer groups in this area,” he told the Soil Association.

“There is a shortage of supply, and the two major producer groups have a good rapport with their farmers. The large processors should recognise that these groups can do a major job for them. If they worked more closely with them, there could be a real mutual benefit.”

Making a breakthrough – beef from dairy herds

This report has made the case for a significant increase in farm-gate prices to boost UK organic beef farming. But it would take some time for such a change to feed through into conversion and additional production. So what can be done in the shorter term to reduce reliance on imports and boost supplies from the UK?

One answer is to turn to beef from the UK’s organic dairy cattle. It is estimated that the UK organic dairy herd produces around 58,000 animals each year that could be used in meat production – 11,600 cull cows, 34,800 beef cross calves and 11,600 dairy bull calves. But many of these animals do not end up as organic meat. What if they could be raised for organic beef, ensuring that a greater proportion of market demand is met from within the UK?

Taste testing by the Meat and Livestock Commission (MLC) and evidence from the scientific literature suggests that using meat from dairy breeds and cross-bred cattle is likely to have a minimal impact on the appeal of organic beef to the consumer. The breed of cattle used in beef production is just one of a range of factors that influence flavour and eating quality, including the diet of the cattle, the handling of animals immediately before and after slaughter and the maturation of the meat.

“Any difference in breeds is only really apparent when people are tasting beef from pure breeds,” explains MLC meat scientist Kim Matthews. “As soon as you have some sort of cross breeding the difference is negligible.

“The diet of the animals is a more important factor than the breed for British consumers, who tend to prefer the flavour of grass-finished or forage-finished animals. After that the post-slaughter factors have a big influence – particularly on tenderness, which I would argue is the most important characteristic.”

Eastbrook Farm Organic Meats has been producing rose veal from organic bull calves for a decade, and this year it produced its first beef from dairy calves. The cattle were slaughtered aged 18 months and the meat was hung on the bone for 35 days. The result was succulent sirloin steaks, ribs and other prime cuts that received rave reviews when they appeared on the menu at the Royal Oak pub in Bishopstone, Wiltshire, where Eastbrook holds the tenancy – proof positive of the potential for producing good-quality beef from dairy calves.

Pricing will be a key issue, however, if farmers are to be persuaded to go down this route in significant numbers. Dairy animals and cross-breeds tend to yield less meat than beef cattle, and they still have to be fed and housed. Eastbrook estimates that the production costs for beef from dairy calves slaughtered at 20 months and hung on the bone would amount to around 90 pence/kg more than for standard organic beef. “In our opinion this product has to be hung on the bone for quality, not put into maturation bags,” says Tim Finney, Eastbrook’s managing director. “Drawing off the moisture from the meat is crucial. Bagging just keeps the moisture in and makes for a poorer but cheaper product.”

Dairy farmers will only produce bull calves for beef producers to finish if beef producers will pay them a price that makes it economic. That means receiving upwards of £250 for a 12-week-old calf.[xxiv] But beef producers will only pay this kind of money if they get a price for the finished beef that makes production viable for them. Once again the key determinant of viability is the final price paid by the processor, and ultimately the retailer, for organic beef.

The way forward

This report paints a worrying picture of growing stagnation in organic beef production in the UK. Market demand is growing but it is increasingly being met with imported beef, undermining the Government-championed ambition of increasing organic production in the UK.

At a time when the Government's Climate Change Bill is proposing 60% cuts in carbon emissions by 2050 to help stave off runaway global warming, this report clearly shows the high environmental cost of over-reliance on imports to put food on our supermarket shelves.

The supermarkets account for two-thirds of UK organic beef sales. These retailers, in particular, need to take urgent action if the fragile confidence of farmers is to be rebuilt and the recent increase in imports reversed.

The retailers should demonstrate their commitment to UK organic beef producers by increasing farm-gate prices by at least 10% in 2008 and forming more long-term partnerships with their UK suppliers. Those that are still relying significantly on imports should make pledges as to the increasing volumes of beef they are prepared to source from the UK in the future, committing to clear targets and a timetable that give farmers the security they need to expand production. Each multiple retailer should commit to a target for the number of animals it will work towards taking for beef from the organic dairy herd.

Together with their processors, retailers should also prioritise protecting and restoring supply partnerships with independent producer groups to help redevelop trust and collaboration throughout the supply chain.

Farmers who are not members of independent producer groups should seriously consider joining groups in order to strengthen future UK production through cooperation and help improve the efficient delivery of volume and continuity of supply to the supermarkets.

The Soil Association believes that it is only in constructive dialogue and in close partnership between the supermarkets and the collective representative voices of organic beef producers that the increasingly challenging task of boosting UK sourcing can be tackled effectively.

---

[i] Soil Association (2007) *Organic Market Report 2007*. Bristol.
[ii] Defra (2002) *Action Plan to Develop Organic Food and Farming in England*. London.
[iii] Soil Association (2007) *Organic Market Report 2007*. Bristol.
[iv] ibid.
[v] ibid.
[vii] ibid.
[viii] ibid.
[ix] Red Meat Industry Forum (2007) *The UK Market for Organic Beef*. Milton Keynes.
[x] Defra (2002) *Action Plan to Develop Organic Food and Farming in England*. London.
[xi] 1.05 miles according to Tesco's website, http://www.tesco.com/storelocator/
[xii] The five closest registered farmers' markets, as the crow flies, are at Great Amwell, Hatfield, Hertford, St Albans and Woolmer Green.
[xiii] Distances calculated using postcodes and AA routefinder mapping.
[xiv] UK distances calculated using postcodes and AA routefinder mapping. Argentine distances calculated using the Ruta0 online routefinder. Sea distance calculated using shipping routes and nautical miles calculator at www.searates.com

[xv] Transport emissions data for this report were calculated using a formula supplied by the UK food and farming umbrella group Sustain. This asserts that typical emissions from a large truck are 63g/kilometre for every tonne of food transported, while typical bulk carrier emissions by sea are 10g/kilometre.
[xvi] Fridge and television comparisons calculated using the electrical appliances carbon calculator at http://www.gdrc.org/uem/co2-cal/co2-calculator.html
[xvii] Stopes, C., Woodward, L., Finney, T. (2007) 'Evaluation of factors contributing to selection of imported organic food compared to domestic products: pork, beef, potatoes and brassicas'. Draft final project report, project OF 0349. London: Defra.
[xviii] The Retail Price Index rose from 173 to 195 between 2002 and 2006 – an increase of 12.7%.
[xix] Holland, H. (2007) *Updated Projections of the Distribution of Single Payment Scheme Payments in 2012 by Farm Type, Size and Region*. Defra Agricultural Change and Environment Observatory Research Report No. 6. London: Defra.
[xx] From January 2008 a change in the organic regulation means that all livestock will have to be fed 100% organic feed for the first time.
[xxi] A number of those interviewed during the compilation of this report asked not to be named for a variety of reasons – to protect commercial confidentiality, for example, or to preserve a position of impartiality, or to prevent punitive action by processors or retailers.
[xxii] Report of Graig Producers feed survey, April 2007, published September 2007. The survey was sent to 282 producers and 29.4% responded.
[xxiii] A number of those interviewed during the compilation of this report asked not to be named to protect commercial confidentiality or to prevent punitive action by processors or retailers.
[xxiv] Based on feedback from producers in a survey by the Organic Milk Suppliers' Cooperative.