

# Improving efficiency, generating better returns & tackling environmental impacts in beef supply chains

This review summarises the available evidence on opportunities to reduce environmental impacts and improve efficiency across beef supply chains. Environmental and economic performance go hand in hand and so, far from compromising commercial performance, we found that there are opportunities to both improve efficiency and generate better returns for all parts of the supply chain.

Current evidence highlights opportunities across three key areas:

## 1. Tackling on-farm greenhouse gas (GHG) emissions

Livestock accounts for c. 5% of total UK GHG emissions<sup>1</sup>. Of this, beef contributes c. 35%<sup>2</sup>. Recent times have seen two major global agreements reached: the UN Sustainable Development Goals and the COP21 Climate Agreement. Both are explicit on the need to involve business in delivering their targets. There is wide belief that emissions can be reduced through wider adoption of best practice techniques at farm level<sup>1</sup>

## 2. Improving carcass yield and residual material use

In 2014, 14% of beef carcasses were too fat when judged against their target specification<sup>3</sup>. This adversely impacts yields and returns. Establishing producer groups is a mechanism for improving returns for all parties. Opportunities for significant savings through better scrutiny and separation of residual materials were also identified.

## 3. Consumer waste

More than 13% of beef products, or £260 million pa, are thrown away in UK homes<sup>4</sup> – a huge waste of resources and lost value for customers. Food waste is increasingly of public and political concern, and there is a real opportunity for businesses to take action and grasp the commercial opportunities.



<sup>1</sup> <http://naei.defra.gov.uk/reports/>

<sup>2</sup> FAO (2013). *Tackling Climate Change through Livestock*.

<sup>3</sup> Cattle Year Book 2015

<sup>4</sup> [http://www.wrap.org.uk/sites/files/wrap/Product-focused%20report%20v5\\_3.pdf](http://www.wrap.org.uk/sites/files/wrap/Product-focused%20report%20v5_3.pdf)

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## On-farm emissions: the scale of the opportunity

There is already a large body of evidence around this hotspot and the significant impact that beef farming has on GHG emissions. It is also well documented that consumers increasingly expect businesses to be acting on such challenges on their behalf.

Data collected by the Agriculture and Horticulture Development Board (AHDB) - Beef and Lamb shows the scale of GHG emissions generated on-farm, as well as the potential for improvement. Figure 1 shows the results from a review of 53 Rearer/Finisher Farms, highlighting the significant difference between the lowest, highest and average performing farms – signalling opportunity.

These data suggest that, **if the gap between average and best practice could be closed by just 10%, then a 6% overall reduction** in emissions could be achieved. Based on annual production tonnages for the sector<sup>5</sup>, this would equate to an annual emissions saving of close to **1 million tonnes CO<sub>2</sub>e**.

Figure 1: Results of the EBLEX survey of greenhouse gas emissions<sup>5</sup>

Survey statistics	kgCO <sub>2</sub> e/kg liveweight
Average	15.24
Lowest	6.18
Highest	29.7

<sup>[5]</sup> EBLEX. Down to earth. The beef and sheep roadmap. Phase 3. 2012.

<sup>[6]</sup> <http://www.fao.org/home/en/>

<sup>[7]</sup> FAO (2013). Tackling Climate Change through Livestock.

<sup>[8]</sup>

[http://www.mcdonalds.com/uk/about-us/newsroom/press-releases/downloads/SUSTAINABLE%20BEEF\\_FULL%20REPORT\\_FINAL%20VERSION\\_27](http://www.mcdonalds.com/uk/about-us/newsroom/press-releases/downloads/SUSTAINABLE%20BEEF_FULL%20REPORT_FINAL%20VERSION_27)

## Is it possible to improve performance?

For all livestock production systems, opportunities exist through the adoption of current best practice techniques at farm level. **The Food and Agriculture Organization (FAO)** <sup>6</sup>estimates that **widespread adoption of best practice could reduce emissions by 30%**<sup>7</sup>.

**McDonald's UK has recently reported a reduction in emissions of 23%** between 2008-2014 on core farms monitored<sup>8</sup>. They have 6 top tips:

1. Measure and monitor.
2. Benchmark performance.
3. Focus on daily liveweight gain.
4. Use protocols to consistently improve animal health.
5. Maximise homegrown forage.
6. Reduce calving interval.

Figure 2 shows a comparison between some of the traits of low and high carbon farms reported by AHDB- Beef and Lamb<sup>5</sup>.

Figure 2: A comparison of low and high carbon farms<sup>5</sup>

Low carbon farm	High carbon farm
<ul style="list-style-type: none"> <li>▪ Achieving optimum daily liveweight gains.</li> <li>▪ Achieving best finishing weight as early as possible.</li> <li>▪ Feeding food quality grass or a high quality ration. where required. Use of co-products where suitable.</li> <li>▪ High output per breeding unit.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Below av. liveweight gain.</li> <li>▪ Light weight at slaughter.</li> <li>▪ High feed rate per kg of meat produced.</li> <li>▪ Low output/breeding unit.</li> </ul>

## How can supply chain businesses tackle on-farm emissions?

There are a range of ways that supply chain business can help reduce on-farm emissions. Some are already being applied. All include working more closely, and collaboratively, with producers. And all can help improve the bottom line.

- ✓ **Benchmark performance.** Benchmarking is an important management tool to drive continuous improvement. Retailers and Processors could work with AHDB-Beef and Lamb to develop the 'Stocktake' system<sup>9</sup> to cover emissions, or encourage the application of tools such as Cool Farm<sup>10</sup> and McDonald's financial 'What If?' tool<sup>11</sup> to help suppliers benchmark their performance.
- ✓ **Enhance the role of beef producer groups** to address emissions reductions and cost savings. A start could be made with those producers who supply a significant number of cattle. Good practice includes knowledge exchange to share management practices & solutions and providing better customer insight.
- ✓ **Use sustainable production standards**, where relevant, such as those being developed by the SAI Platform (Sustainable Agriculture Initiative Platform) for beef to drive improvement in farm performance<sup>12</sup>.
- ✓ **Work directly with industry bodies**, such as the AHDB - Beef and Lamb Better Returns Programme, Hybu Cig Cymru (HCC) and Quality Meat Scotland (QMS), to cascade best practice into the beef supply base.

## What's the commercial incentive?

**Benchmarking can help the bottom line**; there are a number of recent, conclusive examples:

- ✓ McDonald's UK recently announced the results of its carbon studies carried out with UK and Irish beef farms, based on over 1300 carbon assessments. **Farmers who participated in the study reduced their carbon footprint by nearly a quarter (23%) over 6 years and identified annual cost savings of up to £23,000.**
- ✓ Bord Bia has completed 90,000 farm assessments of beef farms' carbon footprint in Ireland<sup>13</sup>. Their work showed that **every 1.5% reduction in emissions brings a financial benefit of €576.** Emissions and productivity gains were reported for a series of management actions. For example, in the Republic of Ireland:
  - *"Increasing lifetime average daily weight gain by 100g could reduce farm emissions by 1% and boost income by c. 63Euro/head"*<sup>13</sup>
  - *"A 10 day increase in length of grazing season could reduce farm emissions by 1.7% and boost income by c. 27Euro/head"*<sup>13</sup>

**Producer groups can help improve resilience.** A 2014 study on the role of producer groups (in this case for lamb in New Zealand) identified a number of key factors which determine the current strengths and future opportunities that producer groups can have. It concluded that the producer group model enables the value chain to better handle peaks and troughs during the season and can have a key role in increasing profitability and stability for farmers and processors<sup>14</sup>.

<sup>9</sup> <http://beefandlamb.ahdb.org.uk/returns/stocktake/>

<sup>10</sup> <https://www.coolfarmtool.org/>

<sup>11</sup> <https://mcdonalds.eco2project.com/Beef/>

<sup>12</sup> <http://www.saiplatform.org/activities/working-groups/beef>

<sup>13</sup> <http://www.origingreen.ie/sustainability-report/>

<sup>14</sup> [http://www.kellogg.org.nz/fileadmin/kellogg/Documents/2014/Jones\\_Landon\\_The\\_Role\\_of\\_Lamb\\_Producer\\_Groups\\_in\\_the\\_NZ\\_Industry.pdf](http://www.kellogg.org.nz/fileadmin/kellogg/Documents/2014/Jones_Landon_The_Role_of_Lamb_Producer_Groups_in_the_NZ_Industry.pdf)

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## The cost of animal intake variability

Across the industry there is a trend towards heavier animals, with more carcasses being classified with fat classes greater than 4L (the retail standard) – 14.2% in 2014, up from 11.3% in 2013<sup>15</sup>.

Both fat class and conformation class have significant effects on the yield of saleable meat from the carcase. The data in Figure 3, for example, show a potential difference in yield of 11%, depending on fat class.

**It is estimated that carcasses that are out-of-specification due to excessive fat content cost UK farmers approximately £12.5 million per annum in lost earnings<sup>16</sup>.**

Figure 3: Overall percentage yield of saleable meat across the classification grid for an average side weight of 144.6kg<sup>17</sup>

Conformation score	Fat class					Overall
	2	3	4L	4H		
U-	76.5	73.8	71.7	70.4		73.1
R	74.8	72.1	70.0	68.7		71.4
O+	73.1	70.4	68.3	67.0		69.7
O-	71.7	69.0	66.9	65.6		68.3
P	70.8	68.1	66.1	64.7		67.4
<b>Overall</b>	<b>74.1</b>	<b>71.4</b>	<b>69.4</b>	<b>68.0</b>		<b>70.7</b>

<sup>15</sup> Cattle Year Book 2015

<sup>16</sup> EBLEX. Marketing prime beef cattle for better returns. EBLEX Beef Better Returns Manual 2. 2014

<sup>17</sup> AHDB Beef and Lamb: The relationship between meat yield from beef carcasses and their classification on the EUROP grid

<sup>18</sup> <http://www.agrisearch.org/attachments/article/215/BovIS-User-Guide-1%200.pdf>

## Opportunities to improve performance

The beef sector is well known for its lack of integration, but there is much for supply chain businesses to gain from working more closely with producers to improve communication of quality requirements, with price incentives aligned. There are already some excellent examples where producer groups provide a forum for price and quality specification discussions to take place, such as the Dunbia/Hereford and Aberdeen Angus Schemes, Sainsbury's Beef Development group and the ASDA/Beef Link. These all provide long-term mechanisms for improvement.

### Bovine Information System (BovIS)<sup>18</sup>

In Northern Ireland, the BovIS on-line bench marking tool was developed by AFBI (Agri-Food and Biosciences Institute) and co-funded by AgriSearch and DARD (Department of Agriculture, Environment and Rural Affairs).

The seven major Northern Ireland abattoirs, accounting for 90% of the annual Northern Ireland kill, submit carcase information to the BovIS database every night, and this is cross-referenced with animal data. The system enables producers to view information such as tag number, carcase weight, fat class, conformation and carcase growth rates from animals within one of the participating meat plants. The intention is that BovIS can assist beef herd management by helping producers to evaluate their breeding, management and production system. The system allows producers to compare the performance of breed types or breeds, as well as animal performance over different timeframes.

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## Adding value to residual material

Figure 4 shows a product and waste hierarchy adapted for ruminant products. From both a financial and environmental perspective, the aim is to maximise, where appropriate, the amount of material that is edible by humans, and minimise the amount of Category 1 and 2 material – which cannot enter the human food chain. This material is typically rendered, and Cat1 Specified Risk Material (SRM) is done so at a cost of around £70/tonne<sup>19</sup>.

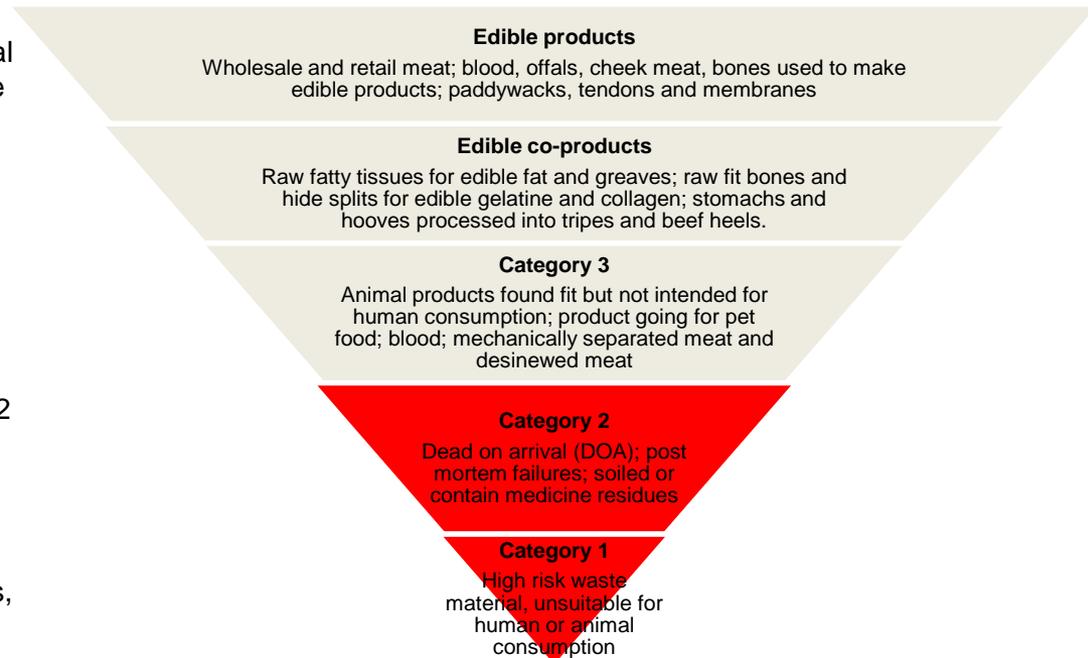
AHDB-Beef and Lamb data suggest that best practice abattoirs currently send c.12% of intake liveweight to Cat 1 SRM rendering<sup>20</sup>. At a site reviewed by WRAP in a recent study, this proportion was c. 19% – suggesting Cat 2 or 3 material can end up with this fate. In this example, **if better separation could be achieved, there is potential for >£240,000 annual savings for the site** – a significant case for scrutinising the composition of residual material.

Improvement opportunities range from relatively quick fixes, such as staff training and provision of bins; to longer term challenges, such as negotiating waste contracts and reducing incidences of rejects. For example, fluke-damaged livers can make up 10-50% of livers processed<sup>20</sup>, but improved communication along the supply chain could support on-farm practice to reduce the level of damage.

<sup>19</sup> Meat Info.co.uk – Animal By-products Rendering – Prices Averages – Region Four (South-West) – Red Meat. January 30th 2015.

<sup>20</sup> EBLEX. The use of animal by-products: The improving opportunities to add value to beef and sheep slaughtering sectors. 2014.

Figure 4: Saleable product, co-products and waste hierarchy<sup>20</sup>



### Actions that can improve residual material use:

- ❖ Review terms of Category 1 waste contracts e.g. capped volumes
- ❖ Provide sufficient bins to enable segregation.
- ❖ Ensure operators are aware of the correct disposal route
- ❖ Engage with suppliers to reduce avoidable offal and carcass rejections
- ❖ Explore alternative markets or outlets for residual materials

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## Consumer waste

A study by WRAP has found that householders discard more than 34,000 tonnes of beef annually (not counting bones & fat)<sup>21</sup>. This is 8% of purchases, or £260 million worth of product<sup>22</sup>.

This is both a significant waste of resources, and cost to householders. Evidence suggests that consumers care about this waste. Asda's Green Britain Index 2015, for example, found that 71% of customers stopped purchasing a product because they had previously wasted it. Food waste is increasingly of media and political interest too, and there is a real opportunity for businesses to take action, be prepared, build brand value and gain a competitive advantage.

### Key actions

There are a number of ways that supply chain businesses can help consumers prevent waste:

- Use consistent, clear date marks, remove "display until" dates and give clear storage & freezing guidance.
- Look at product & pack innovations – e.g. to ensure the most appropriate range or to improve product life<sup>24</sup>.
- Challenge 'product life' protocols – such as historic quality & safety parameters. WRAP research has shown that improving life by just 1-day is feasible in most cases and can improve availability & sales<sup>23</sup>.
- Raise awareness : highlight the changes that you have made to products, packaging and labelling & the benefits this has .

## Packaging innovation for consumer appeal and waste savings



This example of skin-pack technology gives customers up to an extra 5 days of product freshness.

The technology is used by a number of retailers, with reports of sales increases through extended life, better availability and more on-shelf stand out.<sup>26</sup>

### Consumer awareness raising

The Love Food Hate Waste Meaty Issues campaign was launched to encourage consumers to value and make the most of their meat. It included hints, tips and recipe ideas – and materials that businesses can use when raising awareness with customers<sup>22</sup>.



#### References and more information:

<sup>21</sup> [http://www.wrap.org.uk/sites/files/wrap/Product-focused%20report%20v5\\_3.pdf](http://www.wrap.org.uk/sites/files/wrap/Product-focused%20report%20v5_3.pdf)

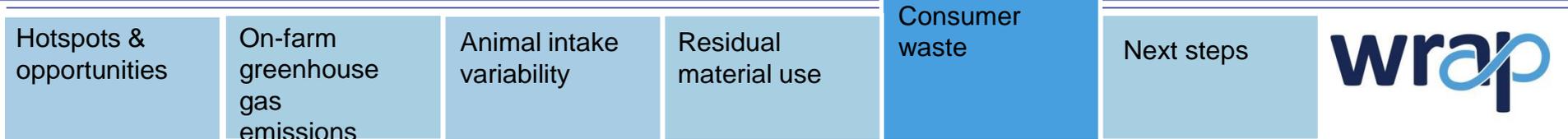
<sup>22</sup> <http://www.lovefoodhatewaste.com/content/meaty-issues>

<sup>23</sup> <http://www.wrap.org.uk/content/reducing-food-waste-extending-product-life>

<sup>24</sup> <http://www.wrap.org.uk/content/concept-consumer>

<sup>25</sup> <http://www.wrap.org.uk/content/food-waste-prevention-digests-meat-fish-and-poultry>

<sup>26</sup> <http://www.fdin.org.uk/2014/05/gbk-launches-new-skin-pack-for-grocery-range/>



## A call to action

Businesses are at risk if they do not have transparency on where the main impacts are arising in their beef farm supply base. There is reason to believe that consumers expect the supply chain to be managing environmental issues such as waste and climate change, and taking action to reduce resource impacts.

Supply chain businesses are well placed to tackle known impact hotspots by:

- ✓ Working collaboratively with suppliers to reduce GHG emissions - for example through producer groups.
- ✓ Adopting best practice frameworks like the SAI Beef Farm Sustainability Assessment.
- ✓ Encouraging the uptake of best practice through benchmarking.
- ✓ Identifying and helping those producers whose cattle are consistently out of specification.
- ✓ Improving carcass balances and adding value to residual materials .
- ✓ Helping consumers to prevent waste through product innovation, clear labelling, advice and raising awareness.

## End-to-end collaboration

Under the Courtauld Commitment 2025, WRAP is convening a partnership of sector bodies and supply chain businesses, which will:



- Take an end-to-end, whole value chain view.
- Review barriers and further opportunities (where needed) to tackle the environmental hotspots identified:
  - Reducing on-farm emissions;
  - Improving carcass yield & value from residual material; and
  - Reducing consumer waste.
- Develop a practical programme of work accordingly, e.g.:
  - Supporting innovation projects that address complex challenges like browning and its contribution to in-store & consumer waste, or future technologies to add value to residual material; and
  - Sharing insight on best practices: the actions that are within reach for every business and their suppliers to improve the bottom line.

This will complement the great work of sector bodies, like AHDB – Beef and Lamb, HCC and QMS and those leading the way in setting on-farm sustainability standards, like the SAI Platform and the Global Roundtable on Sustainable Beef.

For further information, please contact [karen.fisher@wrap.org.uk](mailto:karen.fisher@wrap.org.uk)

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WRAP's vision is a world where resources are used sustainably. It works in partnership with governments, businesses, trade bodies, local authorities, communities and individuals looking for practical advice to improve resource efficiency that delivers both economic and environmental benefits.

Our mission is to accelerate the move to a sustainable resource-efficient economy through:

- re-inventing how we design, produce and sell products,
- re-thinking how we use and consume products, and
- re-defining what is possible through recycling and re-use.

First established in 2000, WRAP is a registered charity. WRAP works with UK Governments and other funders to help deliver their policies on waste prevention and resource efficiency.

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Find out more about our work [www.wrap.org.uk](http://www.wrap.org.uk)

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