Food miles, Carbon footprinting and other factors affecting our trade

Caroline Saunders
Director AERU
Commerce Division, Lincoln University


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Market Access

Trade/ agricultural policy
- Historically main factor affecting our exports
- EU removing export subsidies and internal quota
- EU farmers now get direct payments (SFP)
- US Bio-fuel expansion

Market issues
- Growing demand for compliance with market assurance schemes and labelling: including COOL, Carbon, health and nutrition, biodiversity....

Carbon emissions and Food miles

- Kyoto protocol – carbon trading
- Carbon footprinting
- Carbon neutral
- Food miles
Food Miles

• ‘the number of miles (kilometres) a product has to be transported from the farmer/grower to various stages of production until it reaches the supermarket and finally the plate of the consumer’.

• Simplistic concept .. But traction with popular press and some environment and other ‘groups’

• Ignores energy use and emissions in production

Flaws in food mile concept

• Food miles just considers travel distance

• Excludes energy and emission use in production

• (never mind differences in other inputs)

• So to make true comparison the relative costs of production should be included as well as costs associated with transport
Comparative energy emission performance of NZ agriculture industry

• In this project energy and emissions associated with NZ production and transport to the UK market are compared with alternative source of supply to the UK
• Products chosen are dairy, lamb, onions and apples
• Methodology used is a life cycle analysis approach developed by Wells

Methodology

• Energy use and emissions in 3 types
  – Direct: fuel and electricity
  – Indirect: energy embodied in other inputs
  – Capital: energy used to manufacture capital items
  – Transport to UK

Analysis identified production system in NZ and overseas then calculates energy and emissions associated with these for comparison

This may include storage costs so season of supply can be matched
### Dairy – NZ and the UK

<table>
<thead>
<tr>
<th>Item</th>
<th>Energy MJ/Tonne MS</th>
<th>CO₂ Emissions kg CO₂/Tonne MS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NZ</td>
<td>UK</td>
</tr>
<tr>
<td>Direct energy (diesel, elec.)</td>
<td>9.558</td>
<td>14,482</td>
</tr>
<tr>
<td>Indirect energy (fertiliser, feed, chem.)</td>
<td>11,331</td>
<td>32,877</td>
</tr>
<tr>
<td>Capital energy (tractors, buildings)</td>
<td>2,023</td>
<td>1,009</td>
</tr>
<tr>
<td>Total Energy</td>
<td>22,912</td>
<td>48,368</td>
</tr>
<tr>
<td>Shipping (NZ to UK) (17,840 km)</td>
<td>2,030</td>
<td>125</td>
</tr>
<tr>
<td>Total Energy Input/Emissions</td>
<td>24,942</td>
<td>48,368</td>
</tr>
</tbody>
</table>

**Dairy NZ - UK**

- NZ uses under half energy than the UK does
- Even despite not being able to obtain as detailed data on UK capital inputs
- In general though good data on UK production system
- Reflects very different production systems
### Lamb: NZ versus UK

<table>
<thead>
<tr>
<th>Item</th>
<th>Energy MJ/Tonne carcass</th>
<th>CO₂ Emissions kg CO₂/Tonne carcass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NZ</td>
<td>UK</td>
</tr>
<tr>
<td>Direct sub total</td>
<td>4,158</td>
<td>17,156</td>
</tr>
<tr>
<td>Indirect sub total</td>
<td>3,698</td>
<td>27,452</td>
</tr>
<tr>
<td>Capital sub total</td>
<td>731</td>
<td>1,251</td>
</tr>
<tr>
<td>Total Production</td>
<td>8,588</td>
<td>45,859</td>
</tr>
<tr>
<td>Shipping NZ to UK (17,840 km)</td>
<td>2,030</td>
<td>-</td>
</tr>
<tr>
<td>Total Production Energy Input/Emissions</td>
<td>10,618</td>
<td>45,859</td>
</tr>
</tbody>
</table>

- NZ is 4 times more energy efficient than the UK in lamb production.
- Information on production system for UK not as comprehensive as dairy so the 4 times could be higher!!!
- Reflects different production systems!!!
<table>
<thead>
<tr>
<th>Item</th>
<th>Energy MJ/Ton apples</th>
<th>NZ</th>
<th>UK</th>
<th>CO₂ Emissions kg CO₂/Tonne apples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct subtotal</td>
<td>573</td>
<td>2,337</td>
<td>30</td>
<td>152</td>
</tr>
<tr>
<td>Indirect subtotal</td>
<td>300</td>
<td>624</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>Capital subtotal</td>
<td>78</td>
<td>-</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Total Production</td>
<td>950</td>
<td>2,961</td>
<td>60</td>
<td>186</td>
</tr>
<tr>
<td>Cold storage (UK 6 months)</td>
<td>310</td>
<td>-</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Shipping (NZ to UK) (17,840 km)</td>
<td>2,030</td>
<td>-</td>
<td>125</td>
<td>-</td>
</tr>
<tr>
<td>Total Energy Input/Emissions</td>
<td>2,980</td>
<td>3,271</td>
<td>185</td>
<td>199</td>
</tr>
</tbody>
</table>

NZ more energy efficient by 10 % even including transport

Could be sensitive to yield in UK (only 14 tonnes compared to 50 in NZ) however this is realistic yield

Data on UK production system not good so we did exclude more items from UK system

(further work could compare NZ with other exporting countries to UK such as France and South Africa)
## Onions: NZ versus UK

<table>
<thead>
<tr>
<th>Item</th>
<th>Energy MJ/Tonne onions</th>
<th>CO$_2$ Emissions kg CO$_2$/Tonne onions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NZ</td>
<td>UK</td>
</tr>
<tr>
<td>Direct subtotal</td>
<td>342</td>
<td>245</td>
</tr>
<tr>
<td>Indirect subtotal</td>
<td>427</td>
<td>367</td>
</tr>
<tr>
<td>Capital subtotal</td>
<td>51</td>
<td>66</td>
</tr>
<tr>
<td>Total Production</td>
<td>821</td>
<td>678</td>
</tr>
<tr>
<td>Post harvest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grading</td>
<td>39</td>
<td>62</td>
</tr>
<tr>
<td>Cold Storage (UK 9 months)</td>
<td>3,106</td>
<td>129</td>
</tr>
<tr>
<td>Shipping (NZ to UK) (17,840 km)</td>
<td>2,030</td>
<td>125</td>
</tr>
<tr>
<td>Total Energy Input/Emissions</td>
<td>2,889</td>
<td>3,846</td>
</tr>
</tbody>
</table>

NZ is less energy efficient in production of onions than the UK.
But when storage and transport costs added NZ is more energy efficient.
This is assuming that the UK can actually store the onions, this is new technology!!!
Lincoln Food mile report

- Overall response to report was ‘very positive’!
- Irate emails between certain NGO’s !!!
- Some minor comments from Silsoe and we redid figures using their methodology and we came out better!

Further research

- Add methane and nitrous oxide
- Calculate energy and emissions from alternative sources of supply for comparison
- Compare aviation and shipping
- More detailed analysis of refrigeration
- More products
- Sensitivity analysis especially between different methods
Carbon Footprinting

- Amount of carbon emissions produced
- No standard methodology
- Lot of debate about what should be included (e.g., include consumer energy use of a product)
- Reduction versus offsetting
- Waste products an issue

Policy context

- Kyoto protocol - excludes air travel and shipping
- Climate Change bill in UK – reduce emissions by 60% 1990-2050 (13% from food in the UK (19% recreation)) EU following
- Change in UK from coal to gas means easier to hit targets
- 94% UK population believes climate change real and 66% altering behaviour
- US – HSBC & Yahoo aiming to become carbon neutral
- US – local food expected to grow from $2 to $7 billion from 2002 to 2011
- Japan - reduction in Carbon emissions by 50% by 2050
Carbon footprinting Methodology

• Food miles recognised as flawed concept
• Attention from retailers and others moved to carbon footprinting
• Keen to develop standard methodology and DEFRA, Carbon Trust and BSI are doing this
• NZ being proactive in helping develop this

NZ Policy

• Clark .. lower carbon footprint - carbon neutral government … then country?
• Some discussion about how serious this was
• What are we doing to reduce emissions??
• How aware was NZ to get up to speed on environmental issues
• John Key is proposing a 50% reduction in emissions by 2050
Who’s doing what

- Carbon Trust – labelling of food in UK (and have to make reductions in two year period to keep label)
- Tesco’s – carbon footprint of 70,000 products!
- M & S – investing 200 million pounds
- Carbon footprint calculators – MFE first part is meat consumption!

Market Access issues

- Carbon emissions and Food miles
- Lower meat and dairy consumption
- Local food and seasonal consumption
- Traceability
- Health and nutrition
- Ethical food - fair trade and organic!
- Biodiversity and wildlife
- Water quality
Changing policy

• EU Single Farm Payment – subsidises farmers to comply with environmental criteria and will include carbon footprinting
• EU also pays extra for farmers to comply with market assurance schemes - including animal welfare
• Market assurance schemes already asking for various requirements and recommendations – biodiversity and environmental criteria generally not compulsory yet but will be soon given the subsidises

Conclusion

• Threats to trade changing from regulatory to ‘access-to-market from retailers’
• This has been developing over time
• Carbon footprints are an example of this
• Not just EU markets it is spreading elsewhere