



New Zealand Agricultural and  
Resource Economics Society (Inc.)

## Food miles, Carbon footprinting and other factors affecting our trade

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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

Item	Energy MJ/Tonne MS		CO <sub>2</sub> Emissions kg CO <sub>2</sub> /Tonne MS	
	NZ	UK	NZ	UK
Direct energy (diesel, elec.)	9,558	14,482	385	847
Indirect energy (fertiliser, feed, chem.)	11,331	32,877	739	1,950
Capital energy (tractors, buildings)	2,023	1,009	174	124
<b>Total Energy</b>	<b>22,912</b>	<b>48,368</b>	<b>1,298</b>	<b>2,921</b>
Shipping (NZ to UK) (17,840 km)	2,030		125	
<b>Total Energy Input/Emissions</b>	<b>24,942</b>	<b>48,368</b>	<b>1,423</b>	<b>2,921</b>

## 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

Item	Energy MJ/Tonne carcass		CO <sub>2</sub> Emissions kg CO <sub>2</sub> /Tonne carcass	
	NZ	UK	NZ	UK
Direct sub total	4,158	17,156	256	1,117
Indirect sub total	3,698	27,452	241	1,607
Capital sub total	731	1,251	66	125
Total Production	8,588	45,859	563	2,849
Shipping NZ to UK (17,840 km)	2,030	-	125	-
<b>Total Production Energy Input/Emissions</b>	<b>10,618</b>	<b>45,859</b>	<b>688</b>	<b>2,849</b>

## Lamb: NZ versus UK

- 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!!!

## Apples : NZ versus the UK

Item	Energy MJ/Tonne apples		CO <sub>2</sub> Emissions kg CO <sub>2</sub> /Tonne apples	
	NZ	UK	NZ	UK
Direct subtotal	573	2,337	30	152
Indirect subtotal	300	624	25	34
Capital subtotal	78	-	6	-
Total Production	950	2,961	60	186
Cold storage (UK 6 months)		310		13
Shipping (NZ to UK) (17,840 km)	2,030		125	
<b>Total Energy Input/Emissions</b>	<b>2,980</b>	<b>3,271</b>	<b>185</b>	<b>199</b>

## Apples : NZ versus the UK

- 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

Item	Energy MJ/Tonne onions		CO <sub>2</sub> Emissions kg CO <sub>2</sub> /Tonne onions	
	NZ	UK	NZ	UK
Direct subtotal	342	245	23	16
Indirect subtotal	427	367	32	20
Capital subtotal	51	66	5	6
Total Production	821	678	59	42
Post harvest				
Grading	39	62	1	3
Cold Storage (UK 9 months)		3,106		129
Shipping (NZ to UK) (17,840 km)	2,030		125	
<b>Total Energy Input/Emissions</b>	<b>2,889</b>	<b>3,846</b>	<b>185</b>	<b>174</b>

## Onions : NZ versus UK

- 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 (eg: 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