

The Cold Chain in New Zealand

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The cold chain helped New Zealand become an independent nation

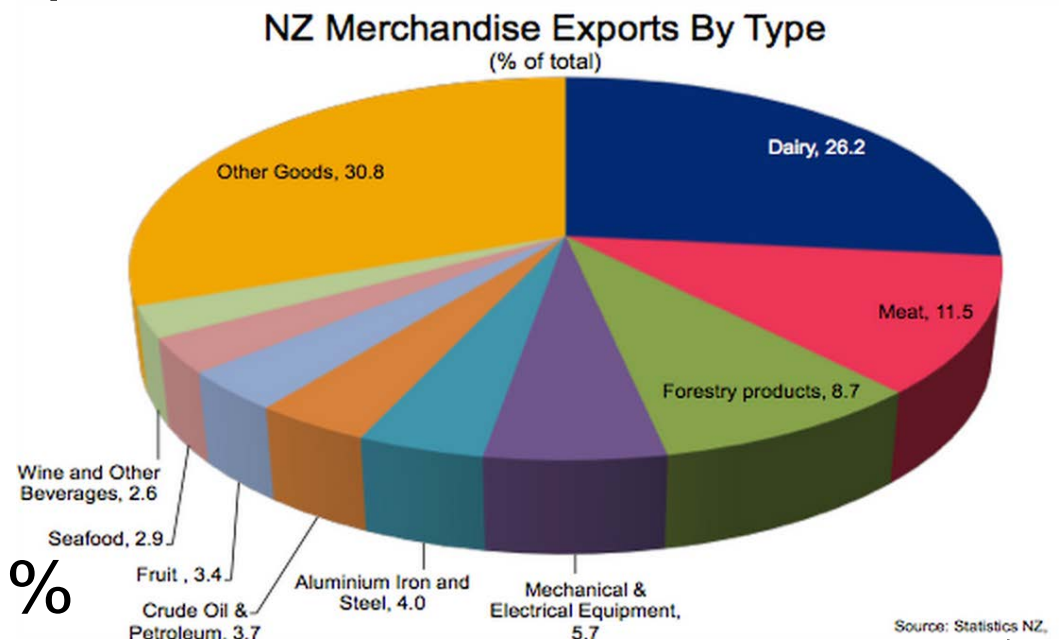
- Refrigerated sea transport allowed NZ farmers to sell lamb meat as well as wool
- Has been argued that it was a key step in the progression of NZ from colony to country
- Refrigeration technology still provides the backbone of much of NZ's export industry



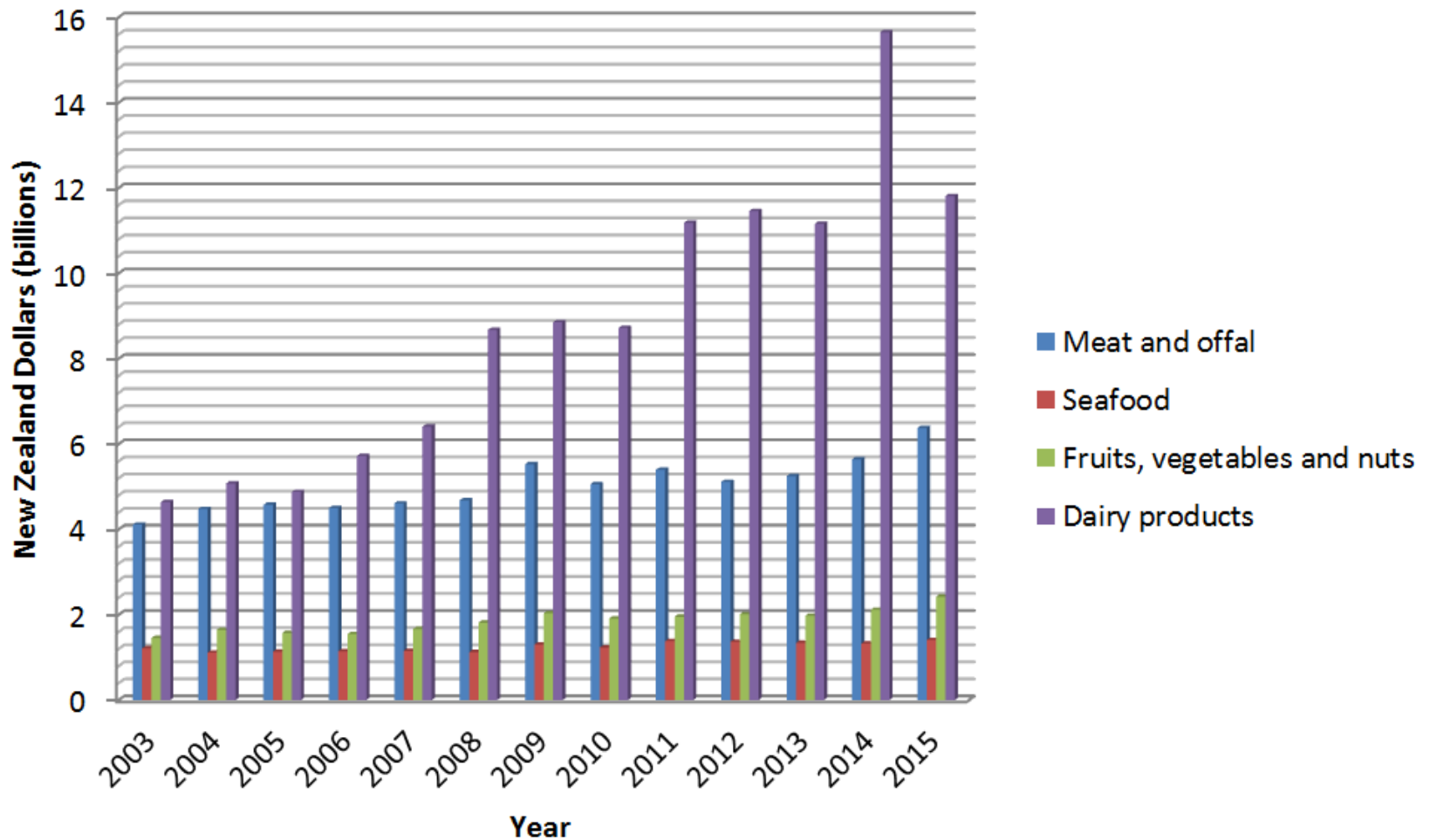
Food exports – critical to New Zealand's economy

- About 45 % of New Zealand's export goods earnings from food products

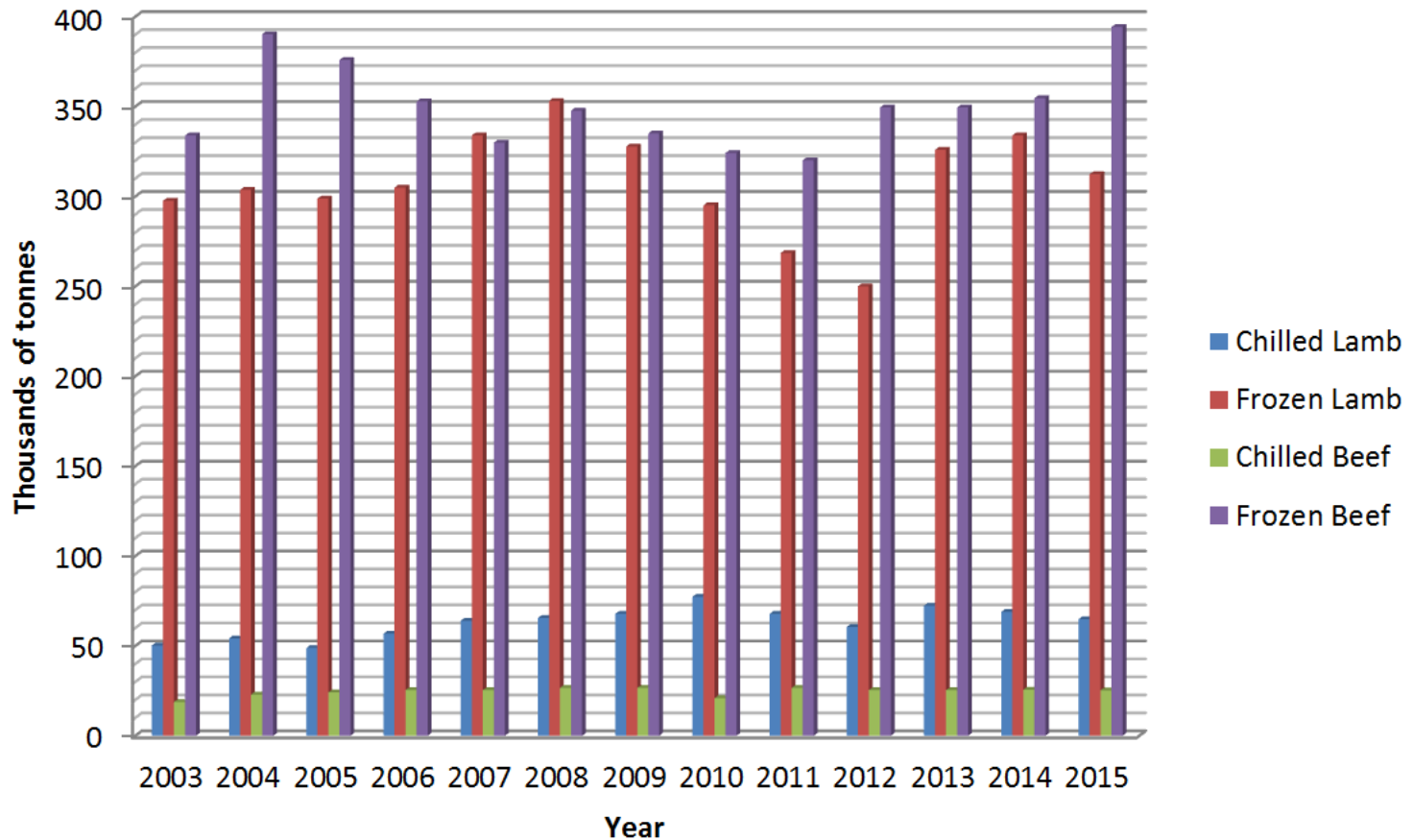
- Dairy 26.2 %
- Meat 11.5 %
- Seafood 2.9 %
- Fruit and vegetables 3.4 %
- Wine and other beverages 2.6 %
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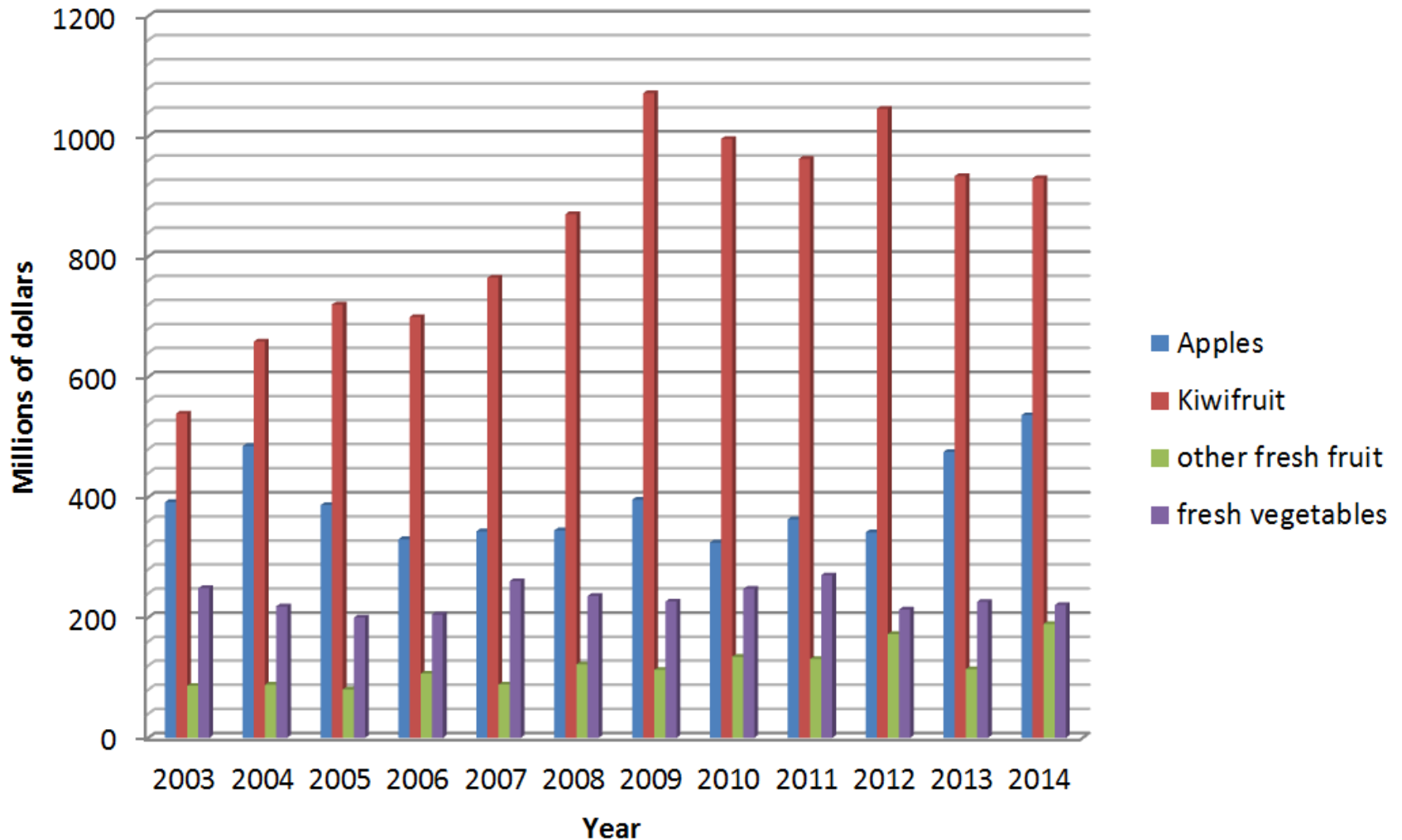
New Zealand exports of major food categories by year



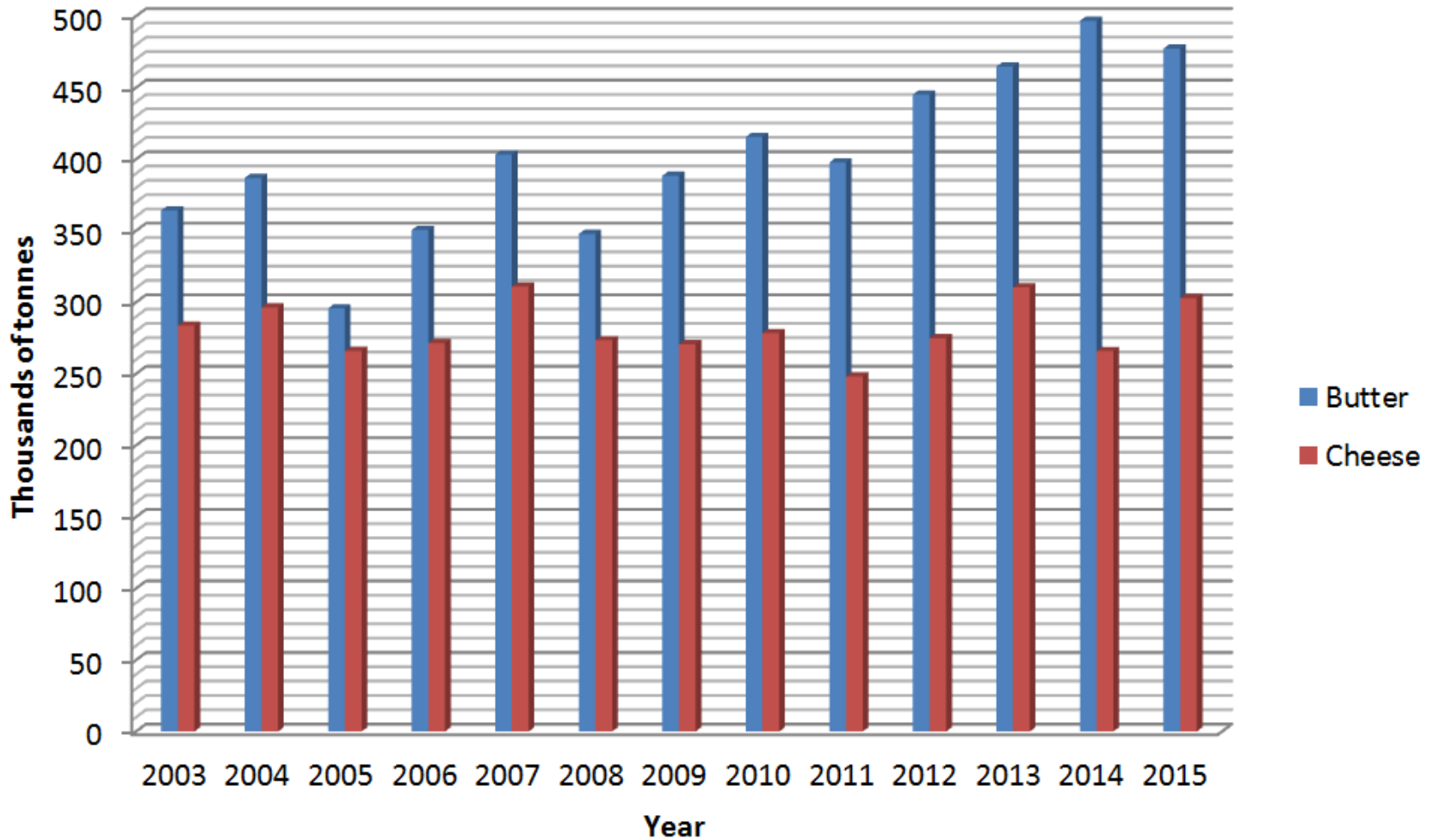
New Zealand chilled and frozen lamb and beef export volumes



New Zealand exports of chilled horticultural products by value



New Zealand exports of cheese and butter

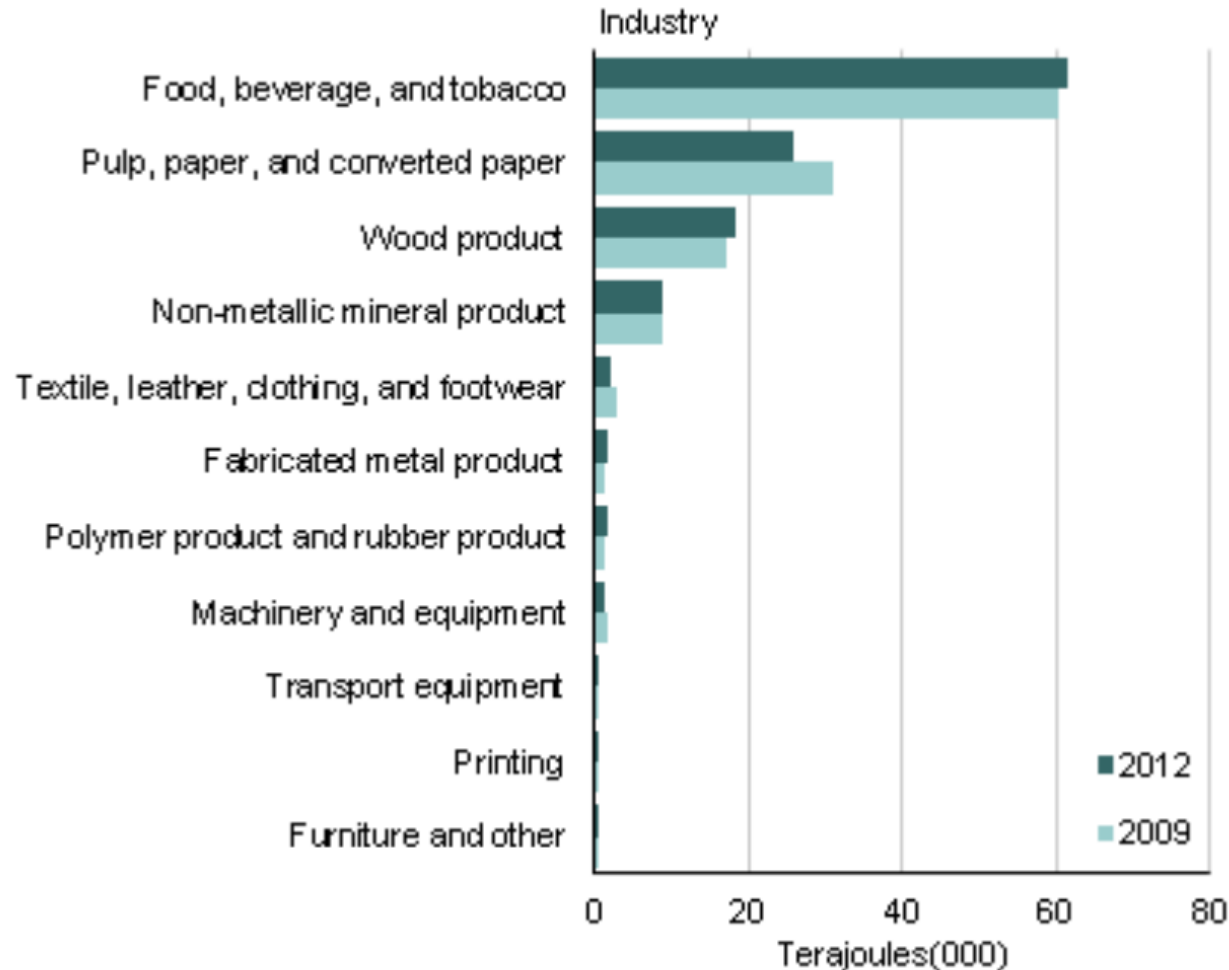


New Zealand cold chains

- Majority of food produced in New Zealand is exported
- Majority of food exported is refrigerated
- Wide variety of foods exported
- New Zealand cold chains Characterised by long transportation times and distances
- Food and beverage sector is the largest industrial energy user

New Zealand food industry energy use

Manufacturing industry total energy use 2009–12

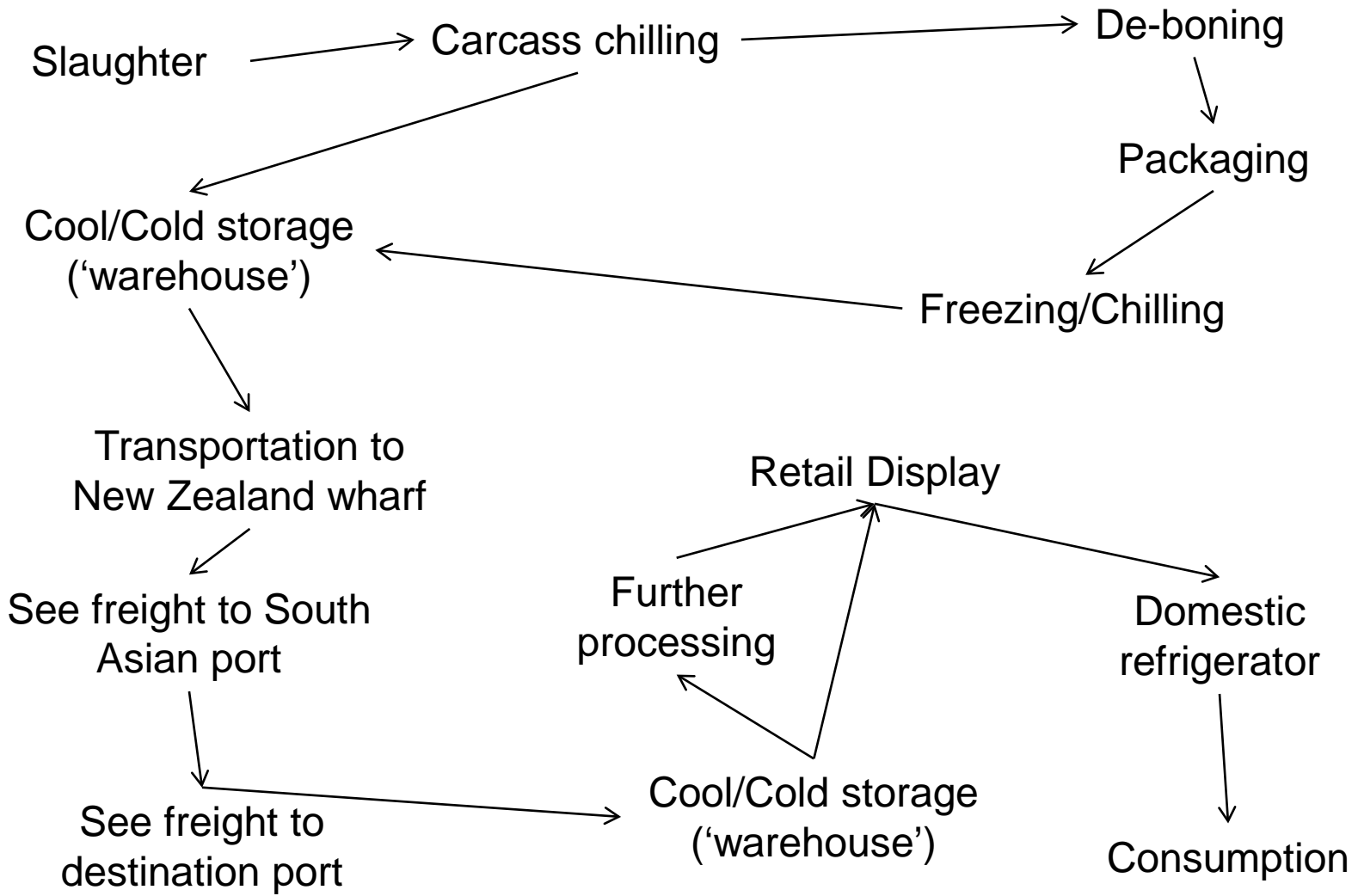


Note: petroleum and chemical product and primary metal and metal product removed due to confidentiality. Hence, totals sum to less than the total industry use for each year.

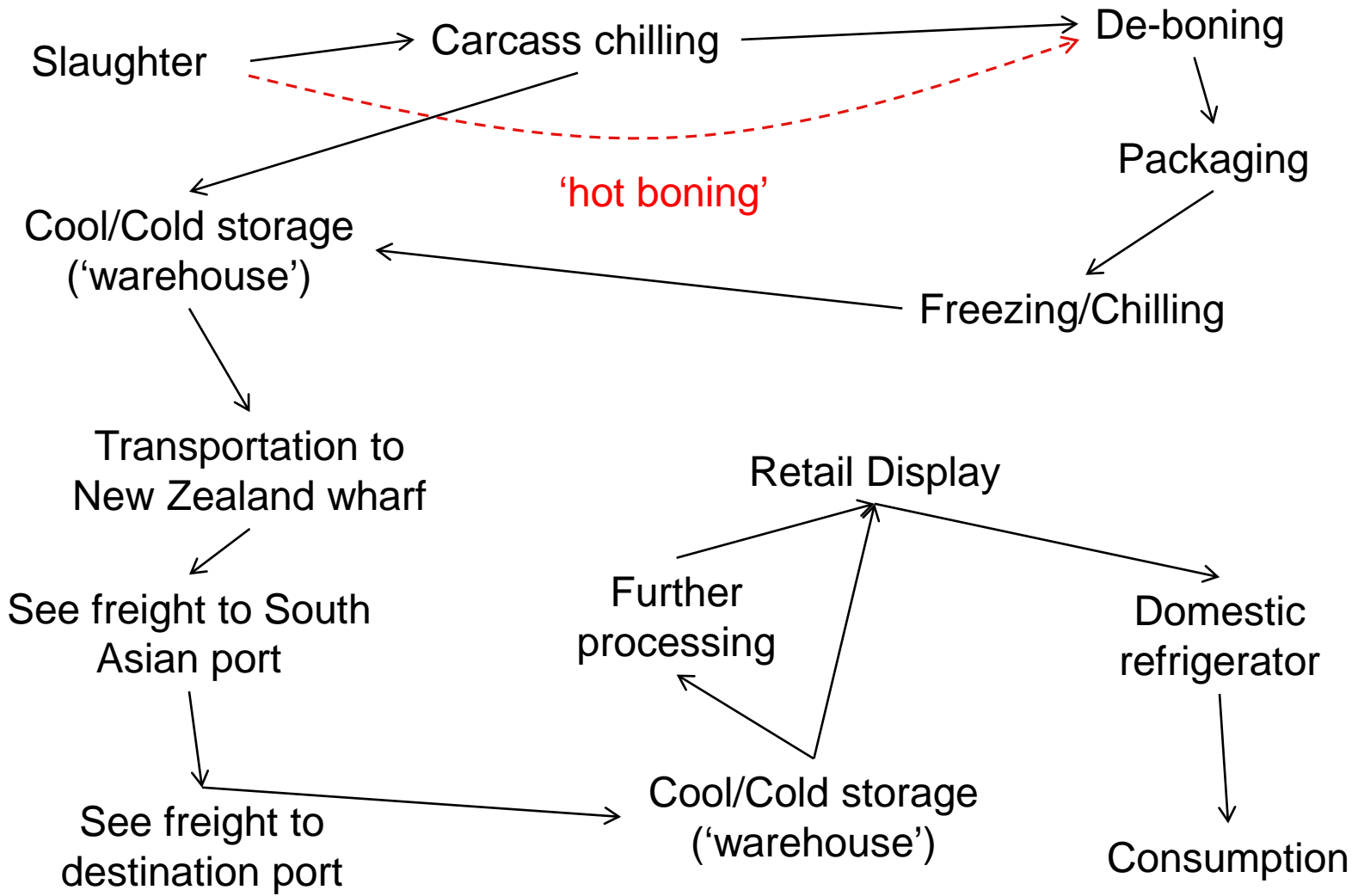
Regulatory bodies

- The *Ministry for Primary Industries* (<https://www.mpi.govt.nz/>) is the chief regulator for food manufacturing and export with codes of practice and regulations for:
 - Animal processing and food manufacturing
 - New product development
 - Cool/cold storage of food for export
 - Food transportation (both locally and for export) and shipping wharves
 - Food Safety
 - Risk management

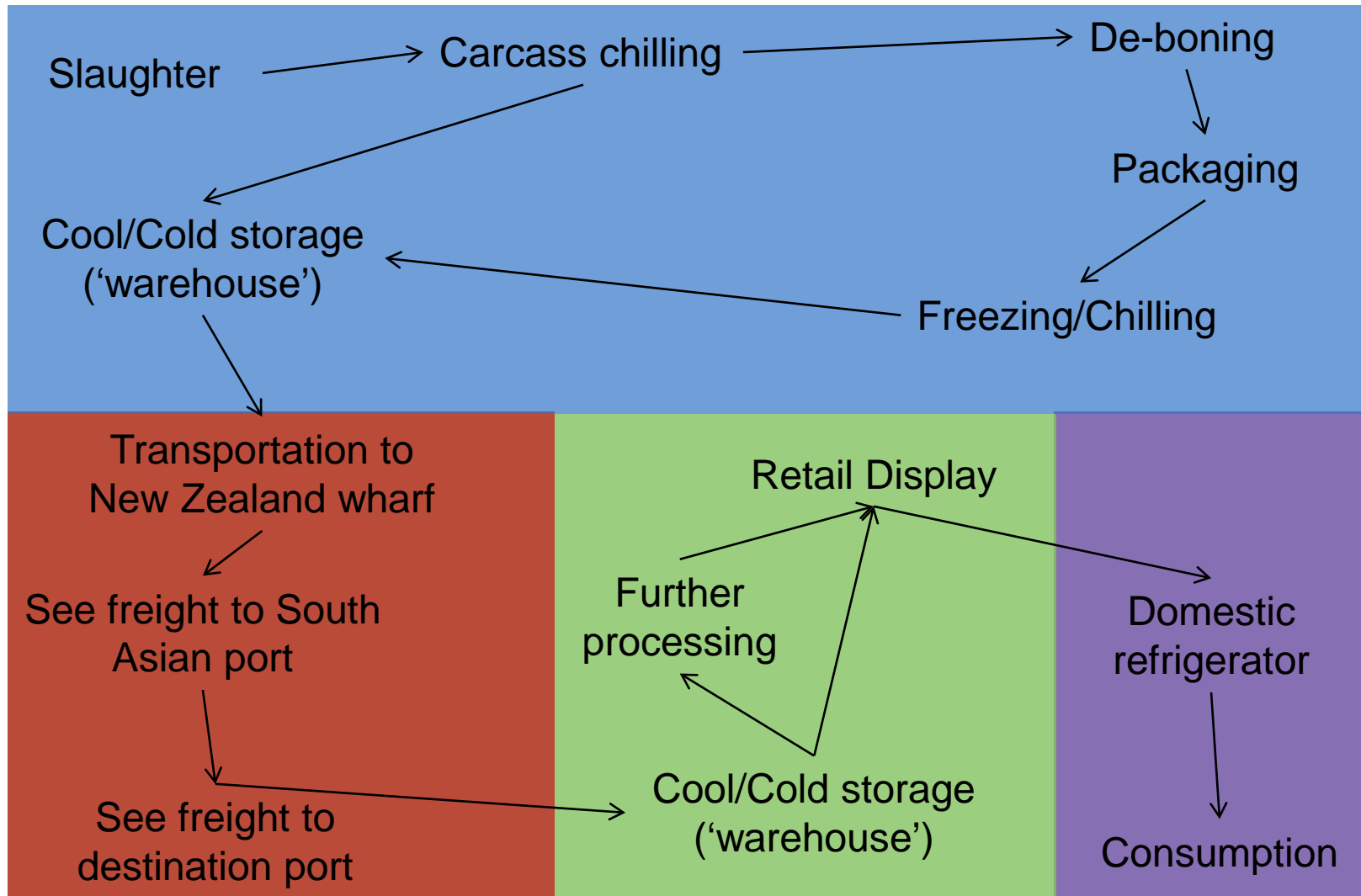
Typical cold chain for exported meat



Typical cold chain for exported meat

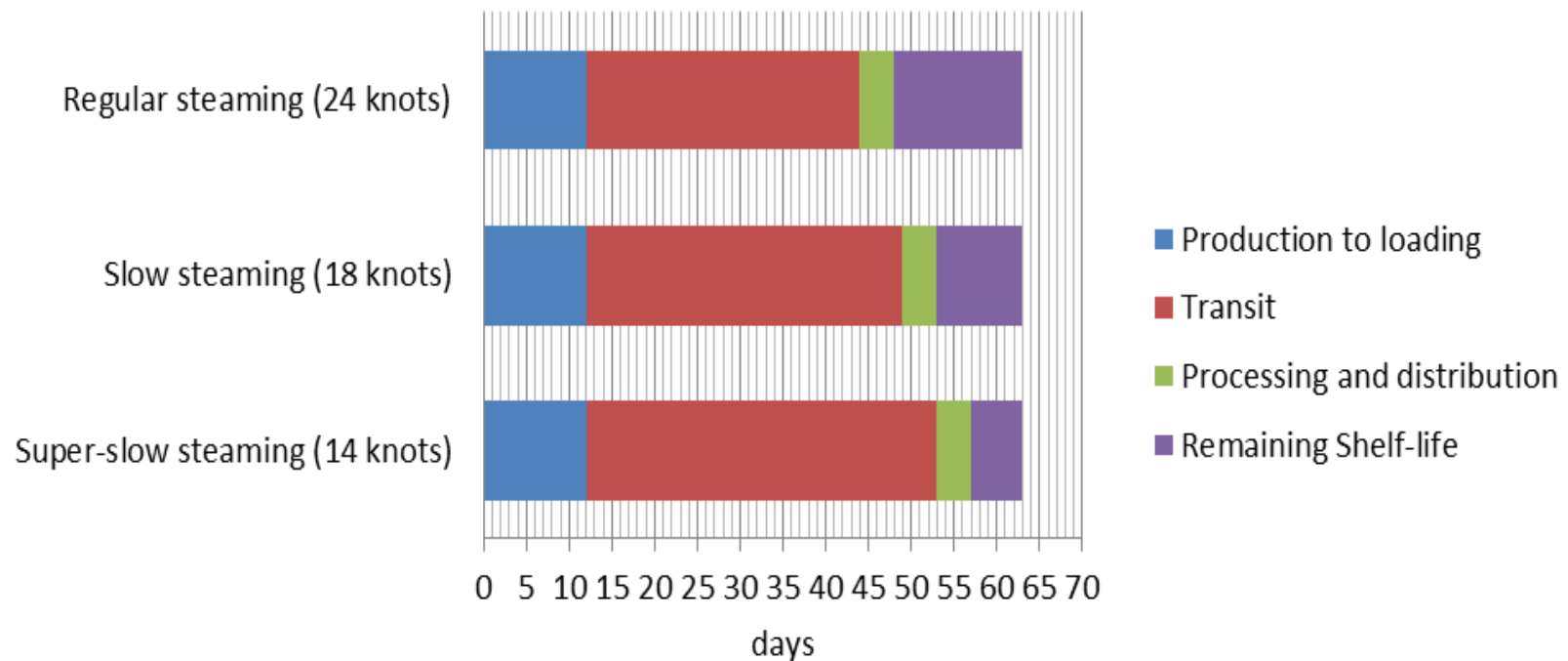


Typical cold chain for exported meat

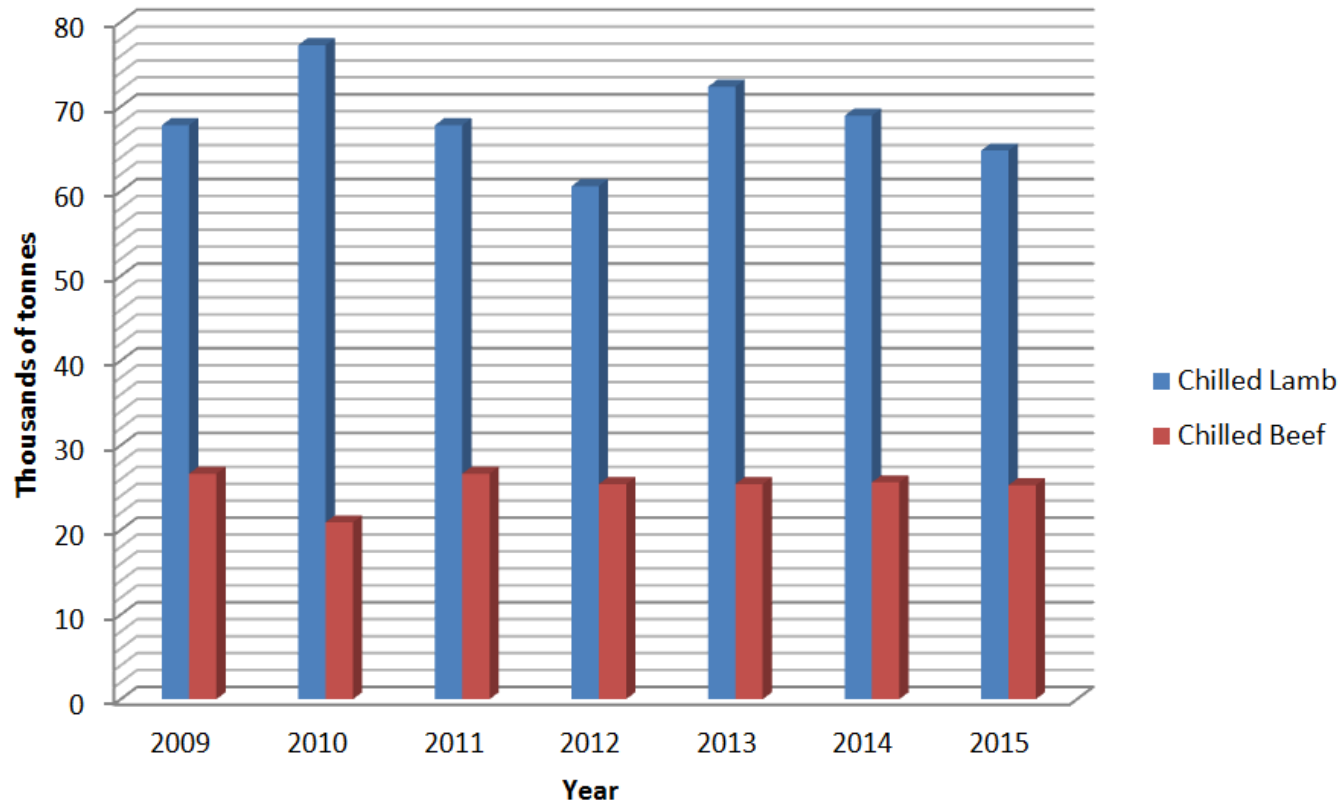


Challenges posed by slow steaming practices

- Chilled lamb exports (adapted from MIA Annual Report, 2012)



Challenges posed by slow steaming practices



Recent research projects in the cold chain for meat

- Improving processing hygiene to extend shelf-life
- Lowering transportation temperature while maintaining the chilled state
- Varying aging time and temperature and freezing rate to improve meat quality
- Investigation of effects of electrical stimulation and pre-rigor conditioning temperature in 'hot-boned' beef
- Improved modelling of chilling and freezing processes

Recent research projects in the cold chain for horticultural produce

- Optimisation of chilling processes and logistics
- Improved fibre-board packaging developments for new markets in Asia
- Improved usage of cool-chain data for horticultural produce
- Advanced grading systems for horticultural produce
- Shelf-life extension for horticultural produce

Summary

- Cold chain vital to New Zealand's economy
- New Zealand's export cold chains are some of the longest in the world
- Continual adaptation and improvement are required in order remain competitive
- Major research themes for refrigerated foods relate to shelf-life extension and product quality maintenance or enhancement during processing