# Carbon Management for the Primary Agricultural Sector In New Zealand

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## Outline



- Context
- Kiwifruit and apple carbon footprinting projects
- Issues arising:
  - Variability between orchards
  - Variability between years
  - Data uncertainties
  - Allocation between different grades of fruit
  - Carbon storage
- Implications for sector-based carbon management

#### New Zealand: Clean and Green

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100% Pure New Zealand, the tourism brand that's almost as quintessentially Kiwi as Tip Top or jandals, entered the world in 1999.

It's hard to imagine that anyone, back then, could have doubted the benefits that would come from developing a single tourism brand for New Zealand. In the year ending December 2000, one year into the campaign, visitor numbers were up 10% and visitor spending had risen 20%.

"Tourism New Zealand's promotion of New Zealand as 100% Pure New Zealand has helped position New Zealand as one of the most sought after and aspirational holiday destinations in the world."

Rob Fyfe, Air New Zealand

"100% Pure New Zealand has undoubtedly lifted New Zealand's profile internationally and given us a strong, clear point of difference."

Tim Cossar, New Zealand Tourism Industry Association

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### New Zealand Context



Export-oriented agricultural sector Value proposition: NZ's clean and green image Food Miles







# **Kiwifruit and Apple Projects**

Funded by MAF with Zespri International and Pipfruit New Zealand (2008-09)

#### **Objectives:**

- To create an agreed method, guidance and case studies
- To begin to create an agreed sector approach to achieving reductions
- To begin to develop strategies for uptake and promotion of agreed approach





# Results for One Tray Equivalent Kiwifruit (3.3 kg kiwifruit)



NEW ZEALAND

Note: Worst case scenario for refrigerant emissions

### Results for Braeburn and Royal Gala Integrated Apples (1 kg apples)





## Issues: Variability Between Orchards (Green Kiwifruit)





## Issues: Yields Between Years (Kiwifruit)







## Issues: Different Grades of Fruit (Royal Gala Apples IFP)





## Issues: Different Grades of Fruit (Royal Gala Apples IFP)





# Issues: Soil Carbon (Apples)



Estimate:

- Soil carbon in rows and alleys of apple orchard over 12 years to a depth of 0.3 m
- Difference between rows and alleys: integrated  $40.3 \pm 25.7$  t CO<sub>2</sub>/ha, organic  $31.2 \pm 55$  t CO<sub>2</sub>/ha [NB 12 v 20 years]

	Soil CO <sub>2</sub> emissions (kg CO <sub>2</sub> /kg apples leaving orchard)	Orchard CF (kg CO <sub>2</sub> /kg apples leaving orchard)	Total CF for apples (kg CO <sub>2</sub> /kg apples)
Integrated: Braeburn	$0.02 \pm 0.02$	0.04	1.16
Integrated: Royal Gala	$0.03 \pm 0.02$	0.06	1.19
Organic: Braeburn	$0.03 \pm 0.05$	0.09	1.22
Organic: Royal Gala	$0.02 \pm 0.04$	0.08	1.24

# Implications for Carbon Management on a Sector Basis



- Potential for improvement based on observed variability in orchards and coolstores/packhouses
- Need to send "right" signals to producers
- Data for shipping
- Sector-based approach pragmatic for "generic" products

Benefits of projects to date:

- Understand "where we are at"
- Stimulated and guided further work on reduction options
- Cooperation between countries

