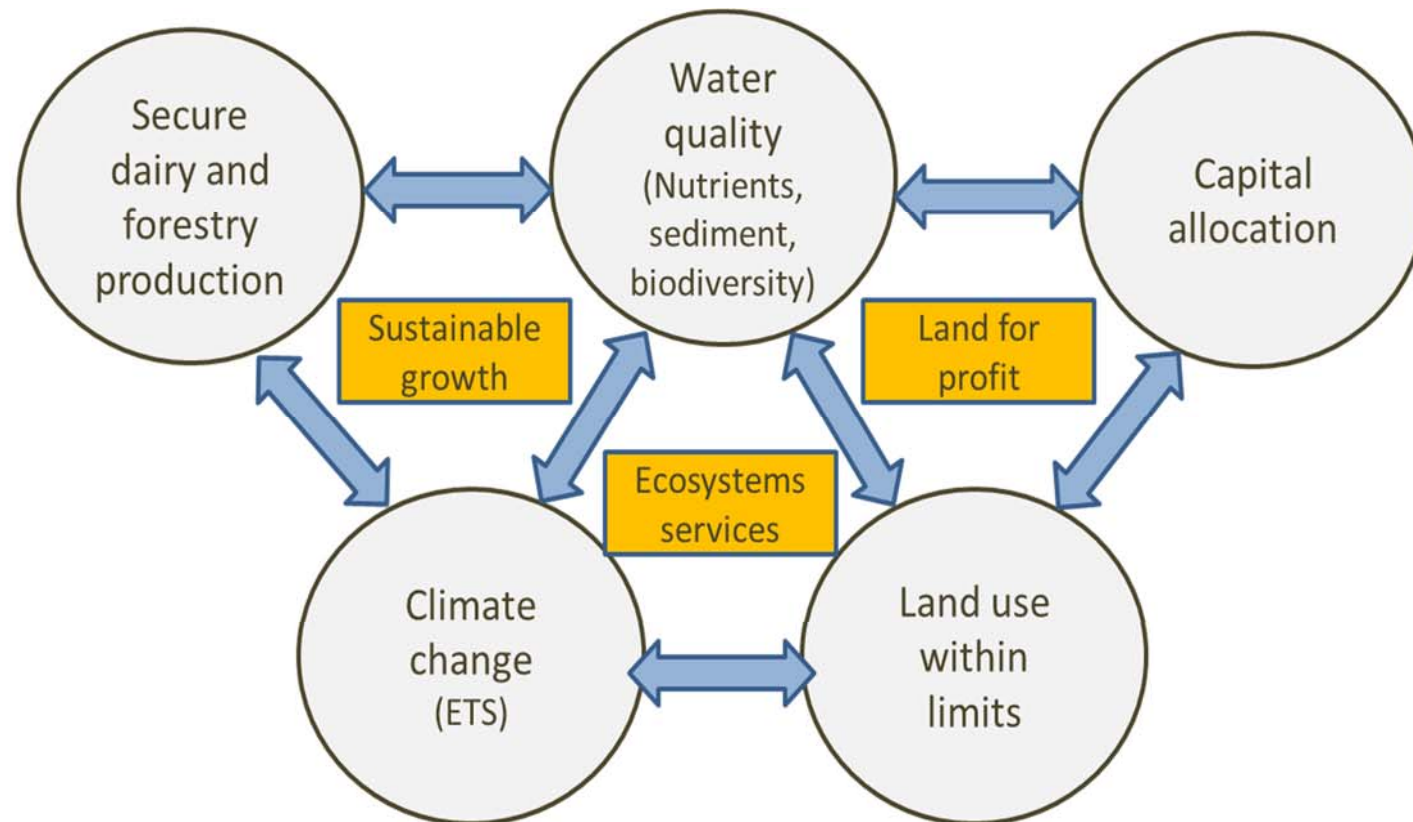


Identifying economic and environmental complementarities between the dairy and forestry industries in the CNI

J. Monge, S. Velarde, R. Yao, S. Pizzirani & W. Parker



The bigger picture – find ways to exploit sector complementarity to achieve land use within limits and regional growth



'Back of the envelope' insights - 2014

		Forest	Dairy
Raw production	Hectares	28,000	26,600 grazable
	Land value	10,000 \$/ha	36,100 \$/ha
	Yield/unit	678 m ³ /ha	950 kg milk solids/ha
	Price range	89 to 102 \$/m ³	5 to 9 \$/kg milk solids
Producer's surplus	Surplus range	22 to 32 million \$/yr	-6 to 96 million \$/yr
	Probabilities of loss	0 %	13 %
	Manufactured Product	67,550 t pulp	38 million kg whole milk
		275,268 green timber m ³	
	10-year avg. export price	737 \$/t pulp	7 \$/kg milk solids
		404 \$/m ³ timber	5 \$/kg whole milk
	Manufactured exports	161 million \$/yr	179 million \$/yr
	Employment: Upstream	84 emp/forest/yr	415 emp/farm/yr
	Downstream	280 emp/mill/yr	175 emp/plant/yr
	Phosphorus	0.05 kg/ha/yr	1 kg/ha/yr
	Nitrogen discharge	3 kg/ha/yr	54 kg/ha/yr
	Nitrogen price	400 \$/kg	400 \$/kg
	Carbon emitted/stored	11 t CO ₂ e/ha/yr seq	10 t CO ₂ e/ha/yr emitted
	Carbon price	7 \$/t CO ₂ e	- 7 \$/t CO ₂ e
	Externality	31 million \$/yr	- 18 million \$/yr

Apples to apples comparison

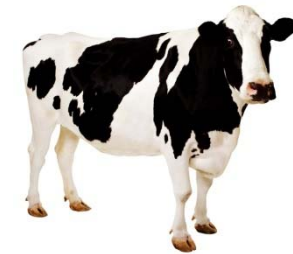
Forestry

- 28 years
- 550 trees/ha
- 678 m³/ha
- \$98/m³



Dairy

- Annual
- 2.5 cows/ha
- 950 kg MS/ha
- \$6/kg MS



Land value

\$10,000/ha



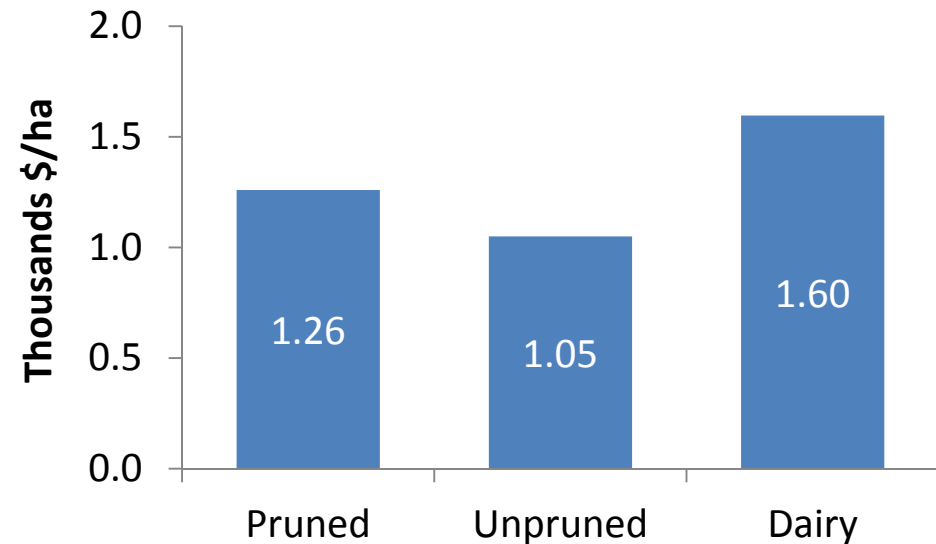
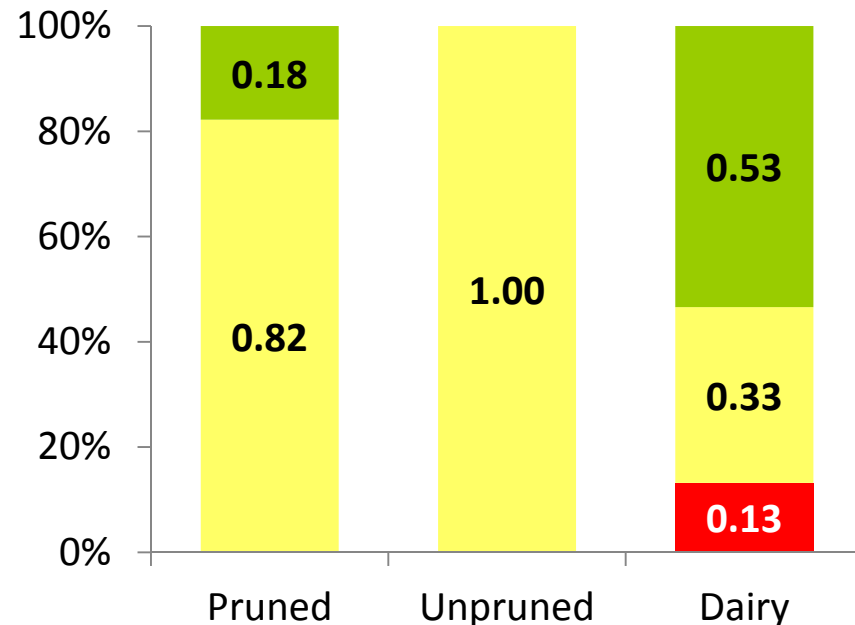
\$36,100/ha

Representative profitability and risk

(noting dairy is mostly on much better quality land)

Representative:

- steady-state forest in CNI
- dairy farm in Waikato



- Green: surplus > \$1,500
- Yellow: \$0 < surplus < \$1,500
- Red: loss

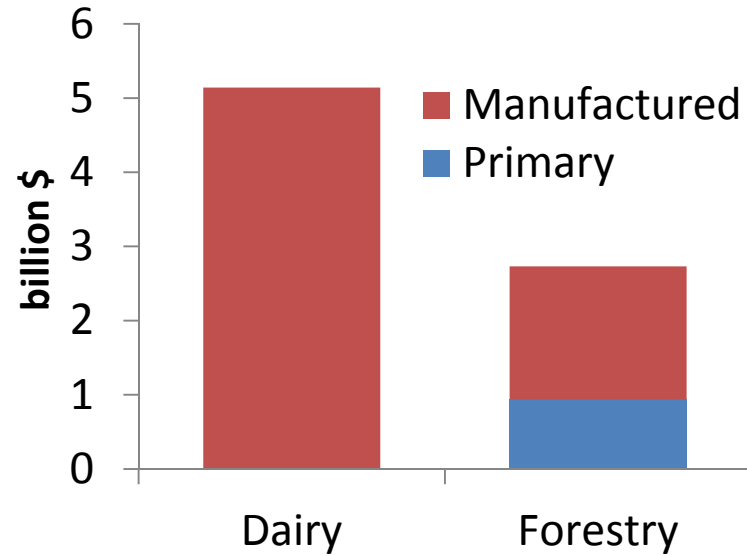
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Manufacturing

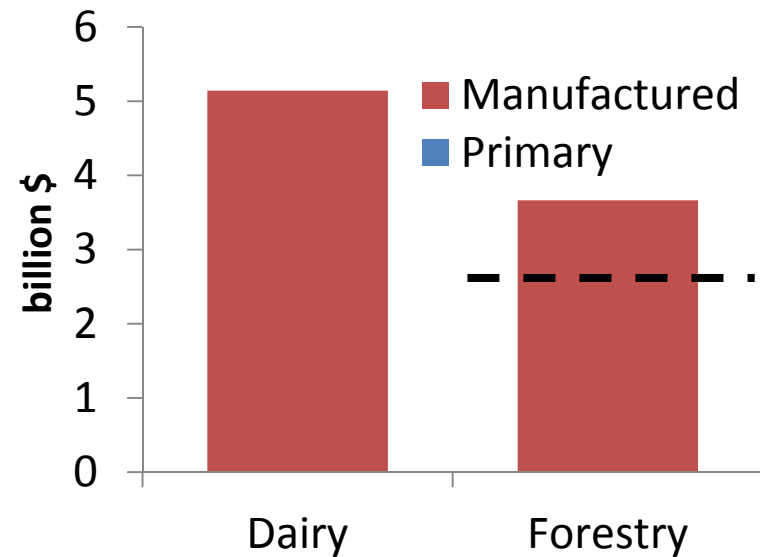
Employment

Value of annual production – actual & potential

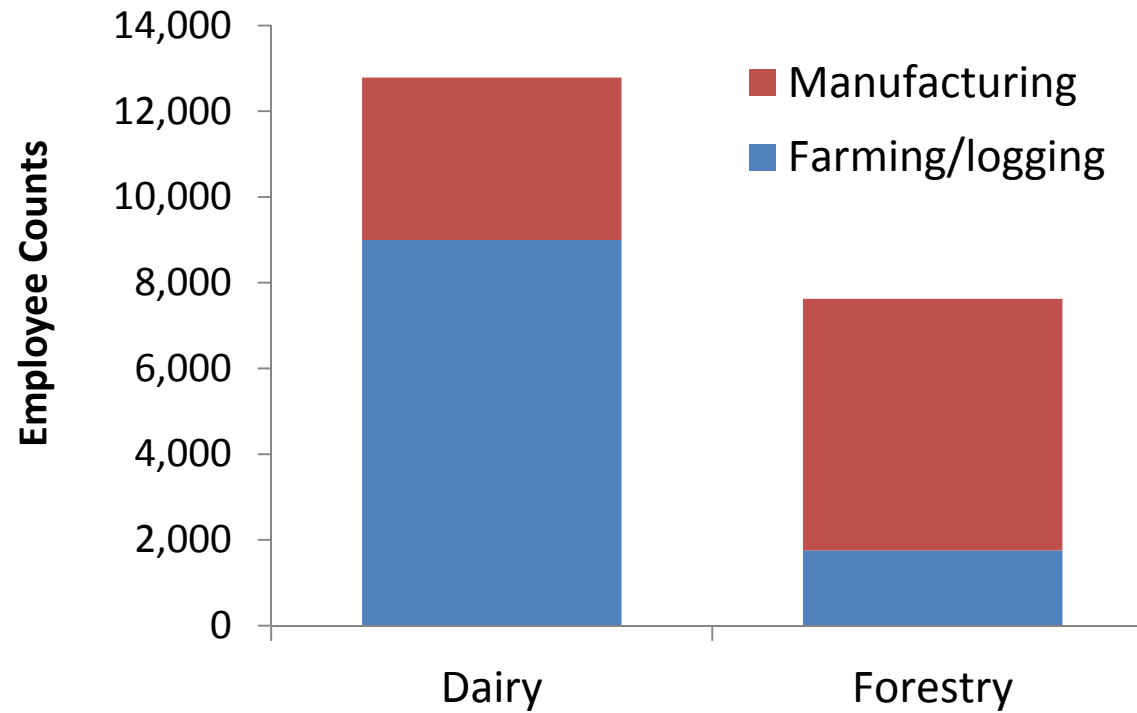


← CURRENTLY

POTENTIALLY →



Regional employment – what the 2014 statistics say



'Back of the envelope' insights - 2014

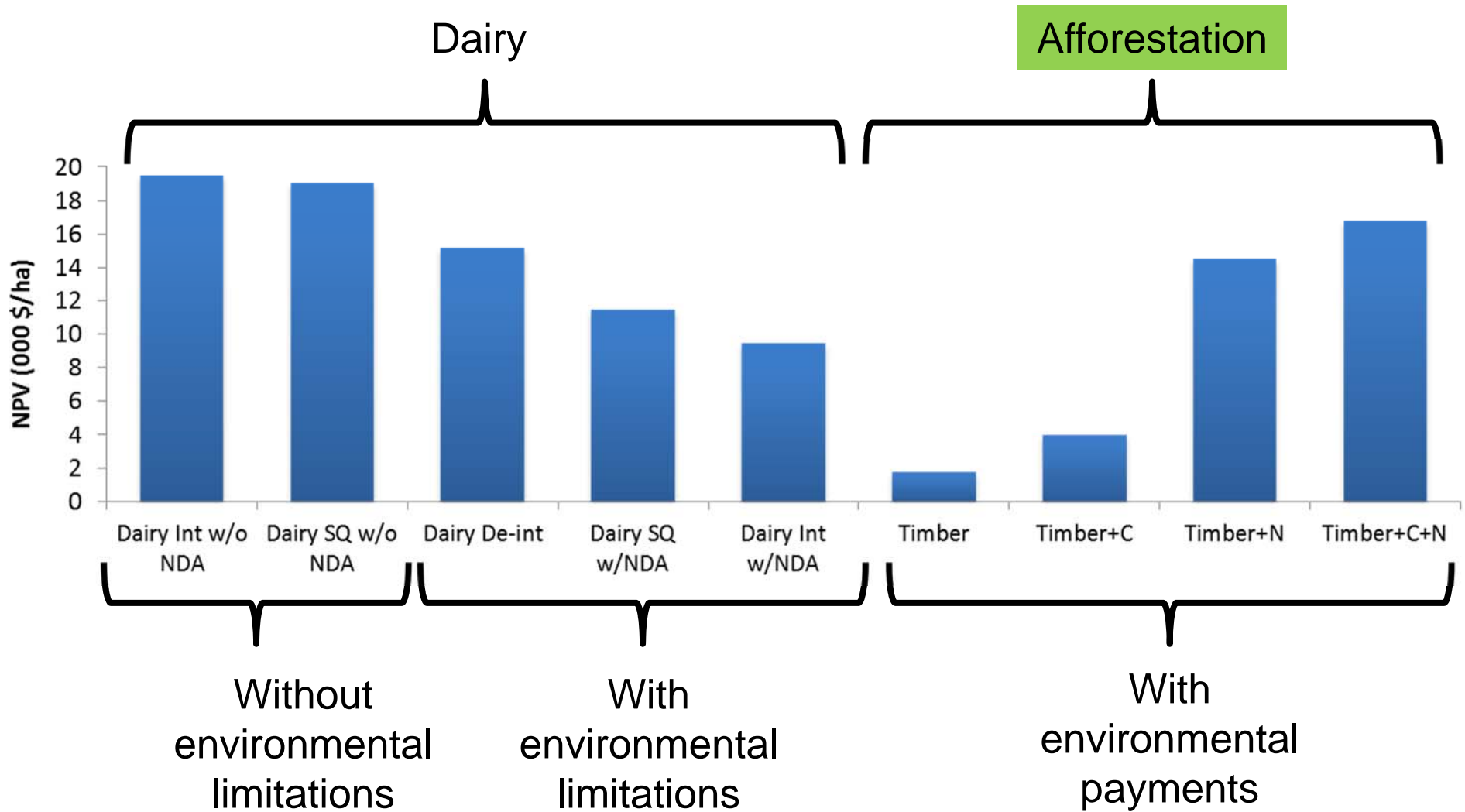
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Environmental



Relative profitability under environmental policies

(discounted NPV per hectare (28 years, 8% DR))



'Back of the envelope' insights - 2014

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EXTERN Externality	31 million \$/yr	- 18 million \$/yr

Conclusions

- Acknowledgment or internalisation of forest ecosystem services is key to:
 - Reach a balanced landscape
 - Sustaining dairy and forestry industries
 - Foster environmental and resilient economic growth
- Good start with creation of ETS and NPS-FW
- Value-add implications needs to be considered
 - Employment and capital generation
 - Manufacturing and export revenue potential

Thank you

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