Alternative land use with low nutrient loss – plantation forestry

Tim Payn

Presentation to Bay of Plenty Regional Council Land TAG

26th November 2014

- Commercial industrial (production) forestry
- Farm forestry, riparians
- Native species plantations
- Managed natural forests

RANGE OF FORESTRY OPTIONS

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Forestry Options

Natural forest			Planted forest			Non-forest
Primary	Modified natural forests	Semi-natural forests		Plantations		Trees outside forest (TOF)
		Assisted natural regeneration	Planted component	Productive	Protective	
						
Forest of native species, where there are no clearly visible indications of human activity and ecological processes are not significantly disturbed	Forest of naturally regenerated native species, where there are clearly visible indications of human activity	Intensive silvicultural management, e.g. weeding, fertilizing, thinning, selective logging	Forest of native species, established through planting, seeding, coppice	Forest of primarily introduced and native species, established through planting or seeding mainly for production of wood or non-wood products	Forest of native or introduced species, established through planting or seeding mainly for provision of environmental services	Smaller than 0.5 ha; tree cover in agricultural land (e.g. agroforestry), trees in urban environments, and scattered along roads and in landscapes

Source: Carle and Holmgren, 2008, modified and illustrated.

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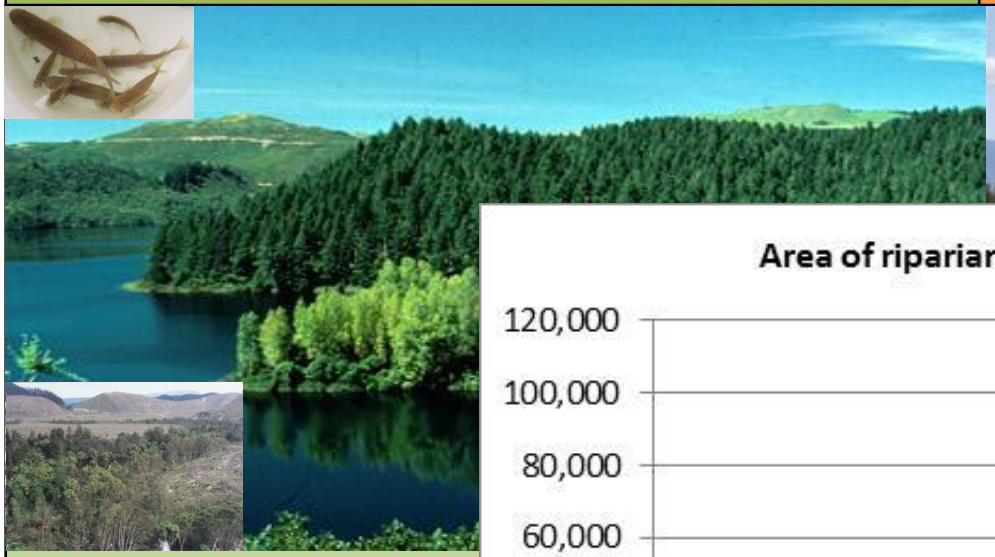
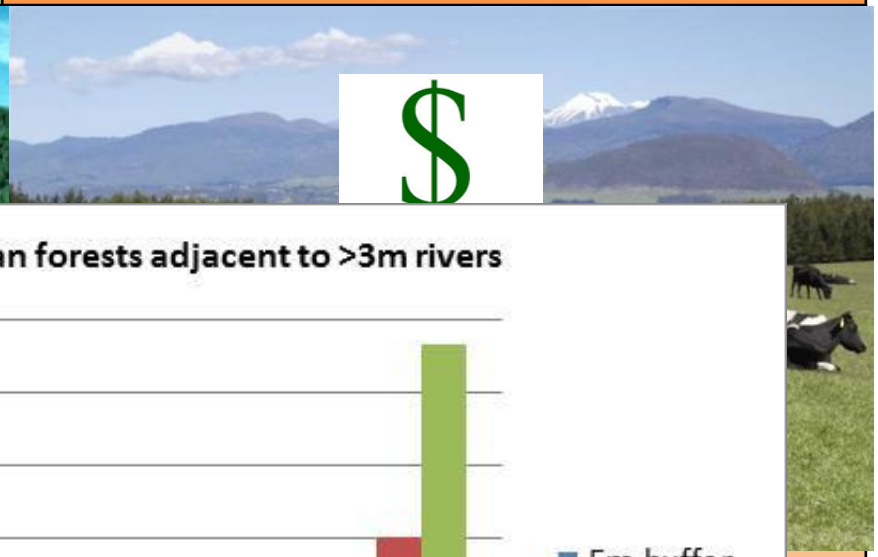
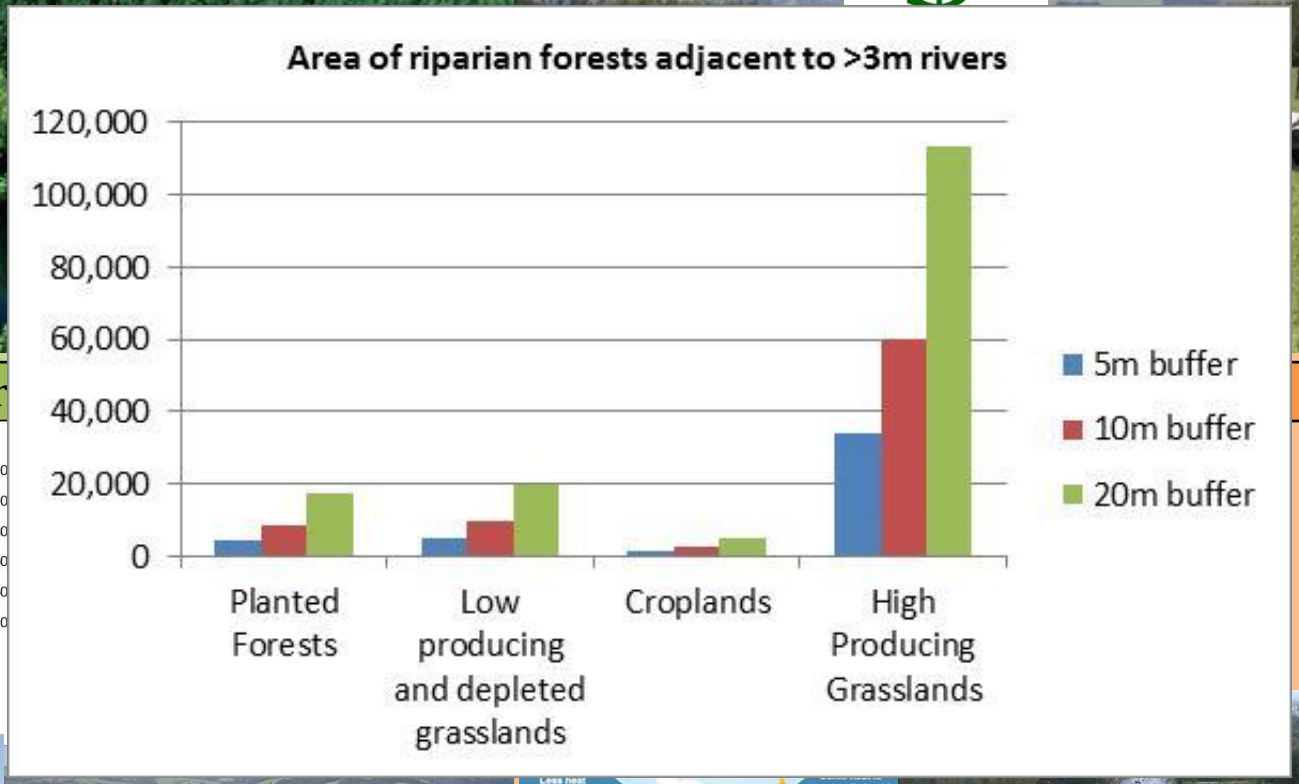
Riparian Forests

Strengths

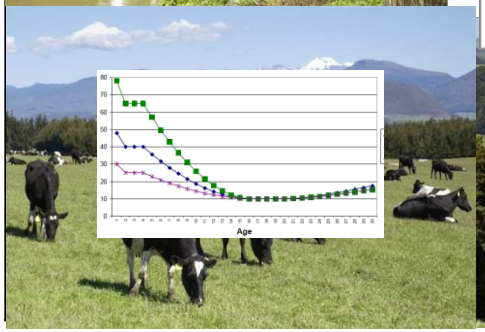


Weaknesses





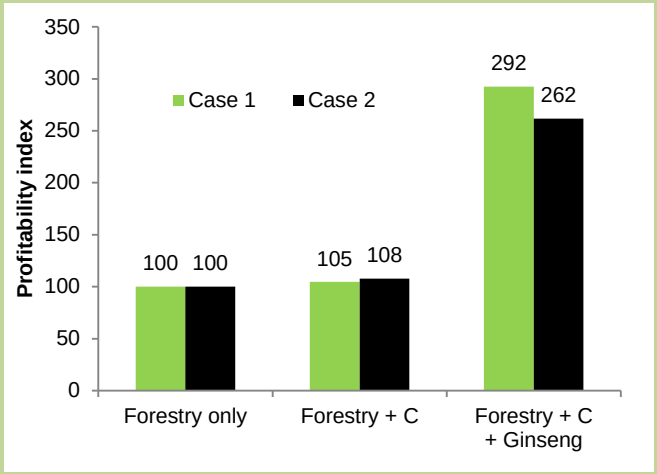
Oppor



Bi-cropping - Ginseng

Strengths

G. Katu
CEO, MaraeroaC

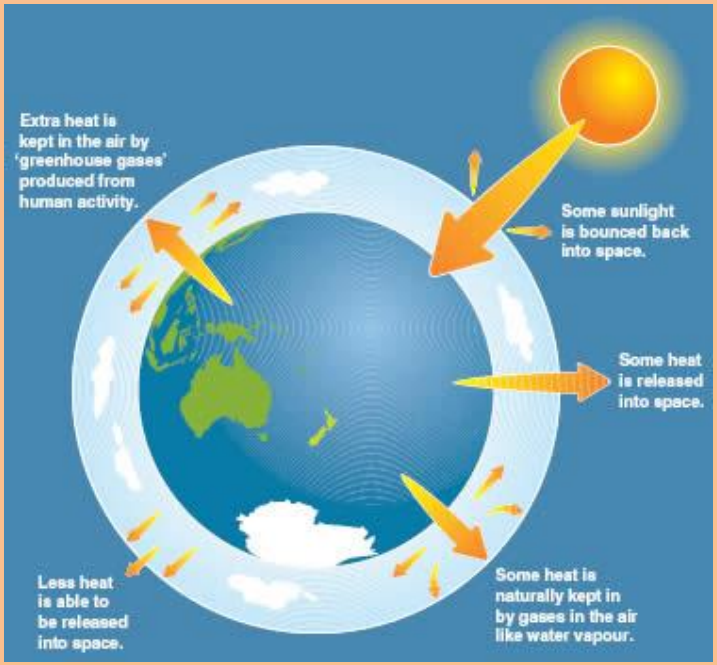


Weaknesses

Opportunities

http://www.paharakeke.co.nz/ginseng-plantation

Threats



- Ecosystem Services
  - Erosion
  - Carbon
  - Water
  - Nitrate
  - Recreation
- Non timber forest products
- Niche forestry products
- Undercropping

ECONOMIC AND ENVIRONMENTAL PERFORMANCE OF FORESTS

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Future forest products sector

INPUTS

Land
People
Values
Plants
Energy
Sunshine
Soil
Water

FOREST

OUTPUTS

Provisioning
- Timber
- Pulp and
- Paper
- Energy
- Food
- Water supply
- Biodiversity

Regulating
- GHG mitigation
- Water quality
- Erosion control
- Flood mitigation
- Pollution control

Cultural
- Aesthetics
- Wellbeing
- Recreation

$4-5bn/yr

New products, markets, income

How much?

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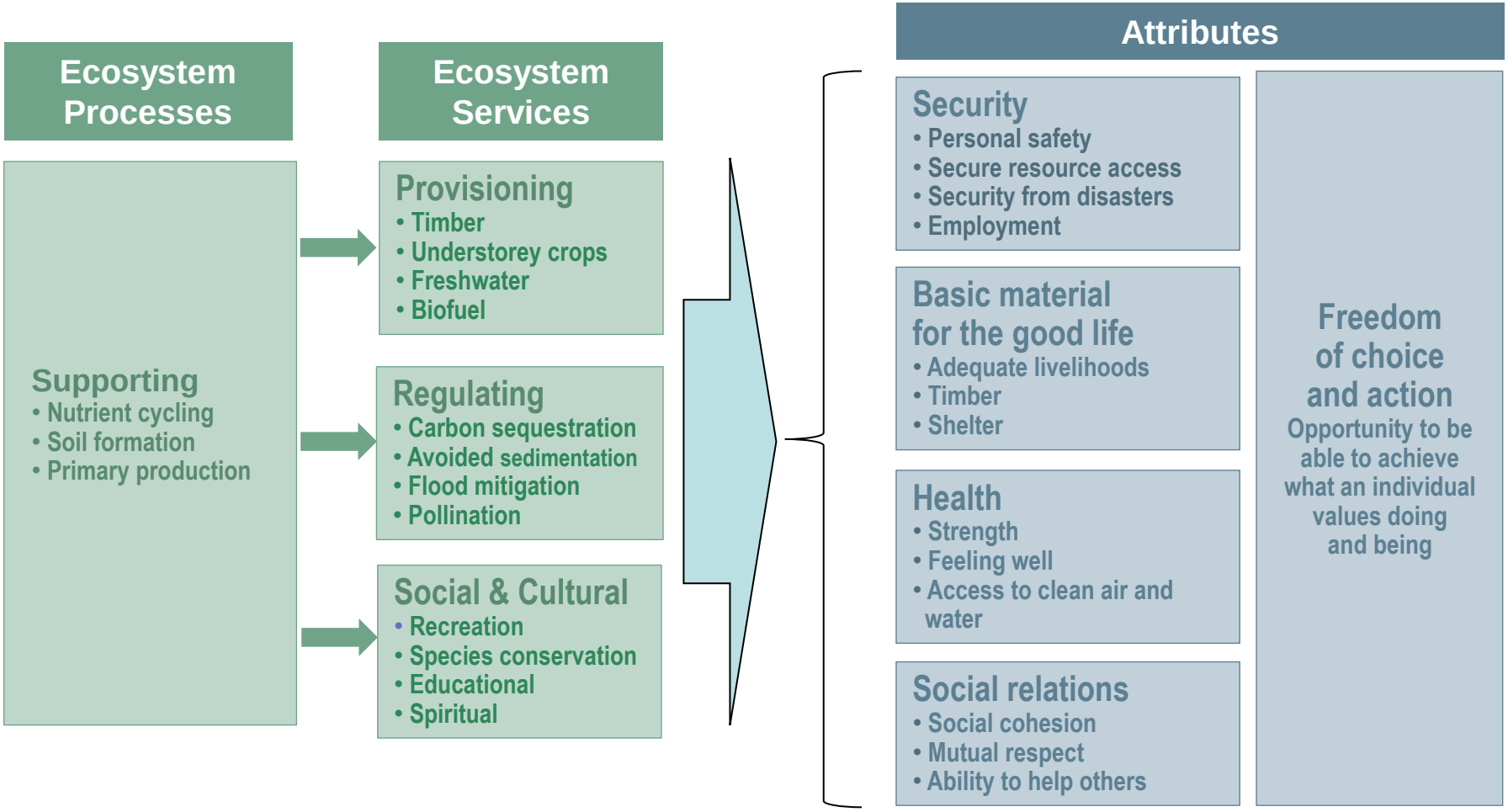
Ecosystem Services Provided by Planted Forests



Adapted from MEA (2005) and Yao et al. (2013)

Recreation

Strengths

FSC

Weaknesses

$

Opportunities

PLANET BIKE

THE BIKE HIRE CO

WWW.PLANETBIKE.CO.NZ

Threats


Manawatu 2004

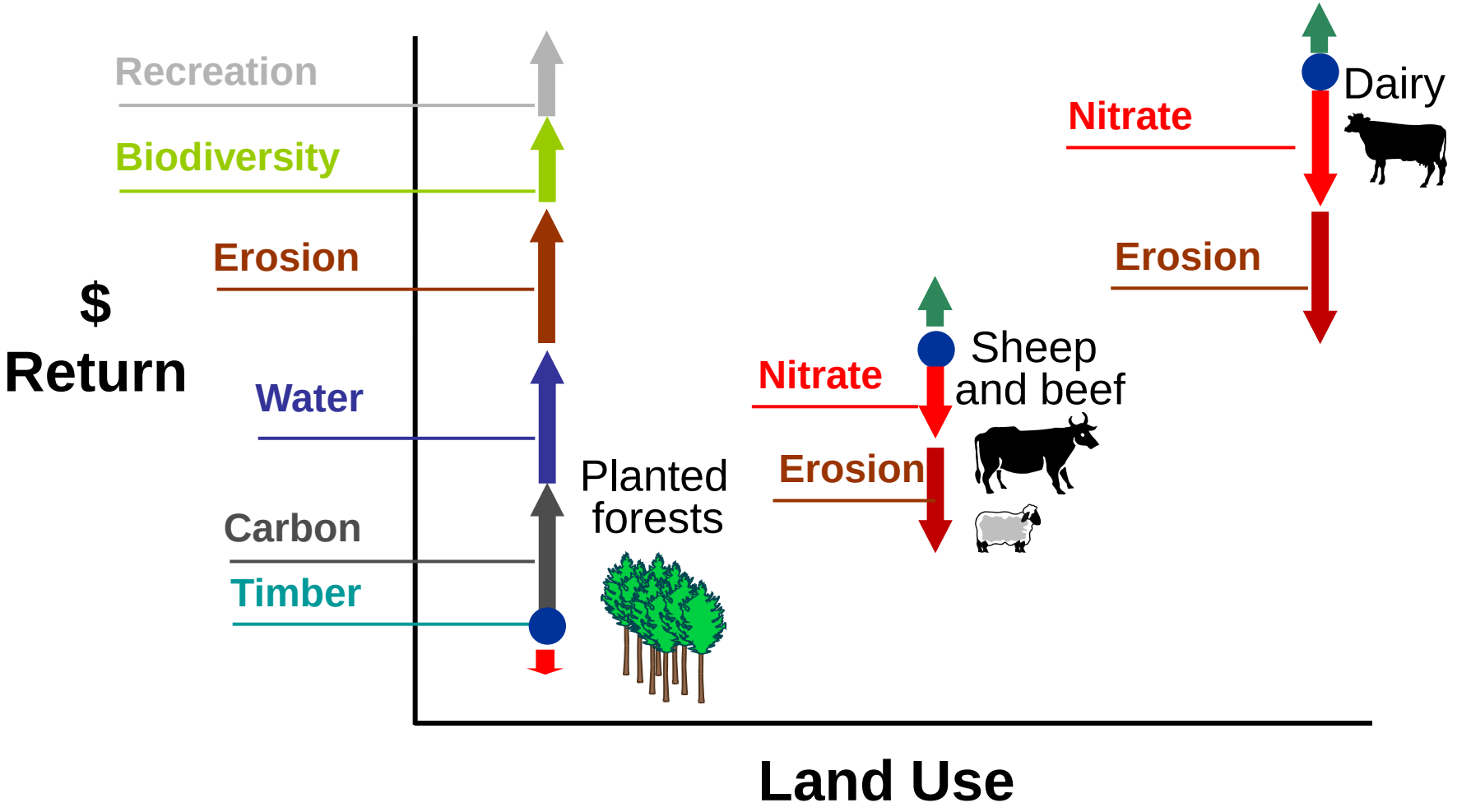
Ecosystem Services: the overall picture

Group	Ecosystem service	*Forest type*	
		Planted	Natural
Provisioning	Wood and fibre	$7.3b	$0
	Bioenergy	$1b	$0
	Understorey cropping (e.g. Ginseng, Kawakawa)	$4/gram	●
	Freshwater	●	●
Regulating	Carbon sequestration ($4/tonne of CO_2)	$100m/yr	●
	Avoided erosion (avoided sedimentation)	$1,250/ha/yr	●
	Flood mitigation (avoided flood damage)	$250/ha/yr	●
	Air quality	●	●
	Water quality	●	●
	Water quantity	●	●
	Habitats	●	●
Cultural	Recreation	$100m/yr	$3m/yr
	Conservation of endangered species	$28m/yr	●
	Aesthetics	●	●
	Cultural heritage	●	●

CNI forest vs dairy: what is the net economic value to NZ? ("rough est.")

	Forest		Dairy	
Hectares	28,000		26600	grazable
Stocking	550	trees/ha	2.75	cows/ha
Yield/unit	600	m m3	350	kg MS/cow
Rotation	28	years	1	seasonal
Total yield	600,000	m m3	25,602,500	kg MS
Ave price	110	$ m m3	8.65	$ payout
Total income	66,000,000	$	221,461,625	$
Net	33,000,000	$ stumpage	80,647,875	$ EFS
Product	270,000	t pulp	24,322,375	kg product
Price	865	$US/tonne	9.30	$NZ kg product
Export $	**274,764,706**		**226,198,088**	
Land value	10,000	$/ha	38,500	$/ha
Nitrogen	140		1224	tonnes/yr
Phosphate	?		1330	tonnes/yr
Carbon (GHG)	1003	t stored/ha	6	t GHG/ha emitted
Employment	>300	Kinleith mill	266	on farm

Changing the economic paradigm – full cost accounting



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- Forecaster
- AEM
- MyLand
- NuBalm
- Forest Investment Finder
- Biomass model
- ‘Octopus’

TOOLS TO OPTIMISE FORESTRY WITHIN A CATCHMENT

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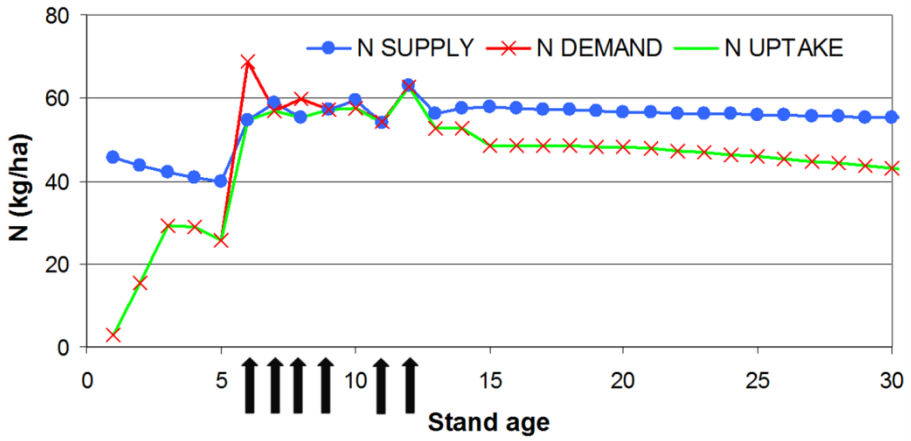
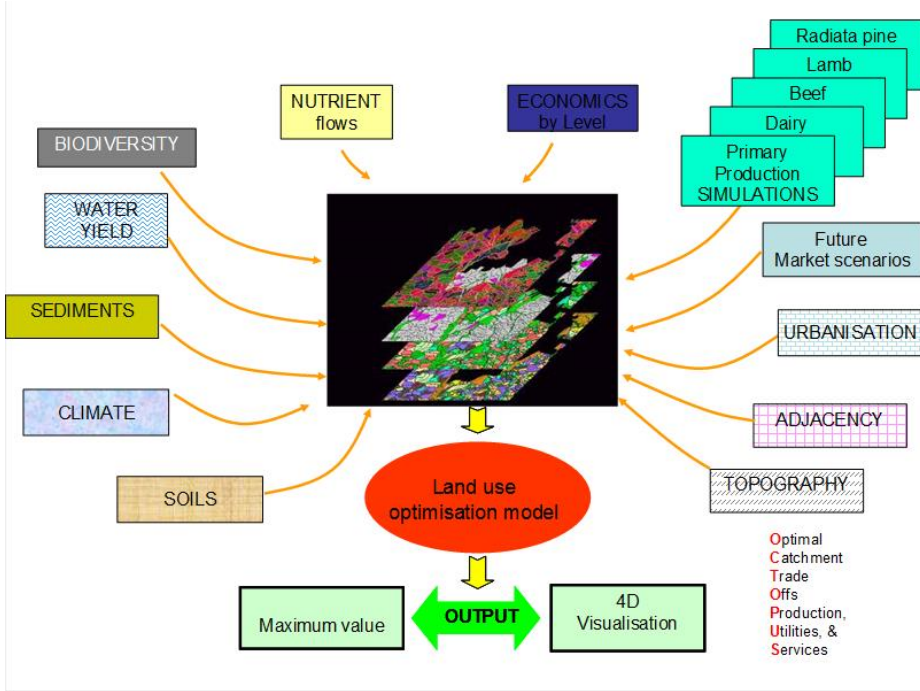
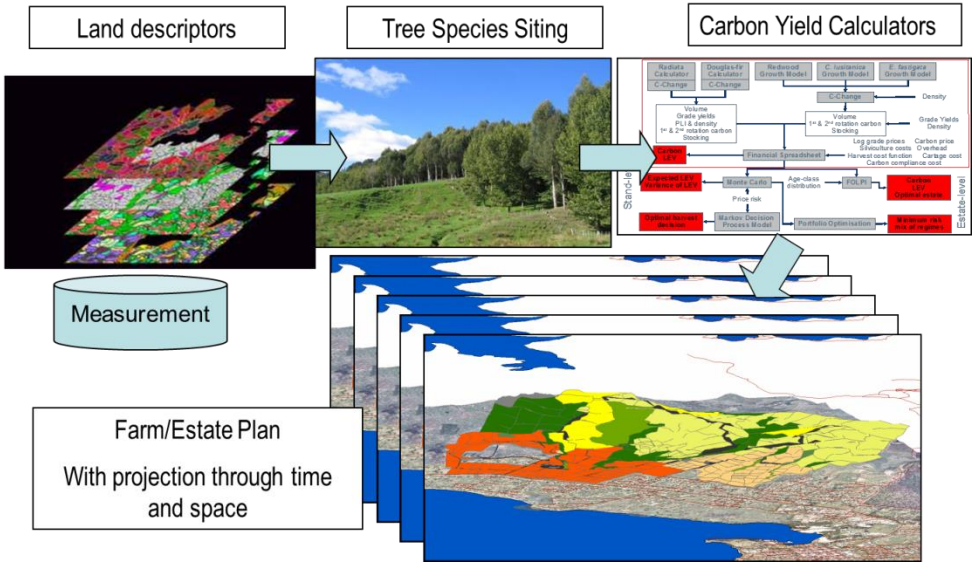
NuBalm

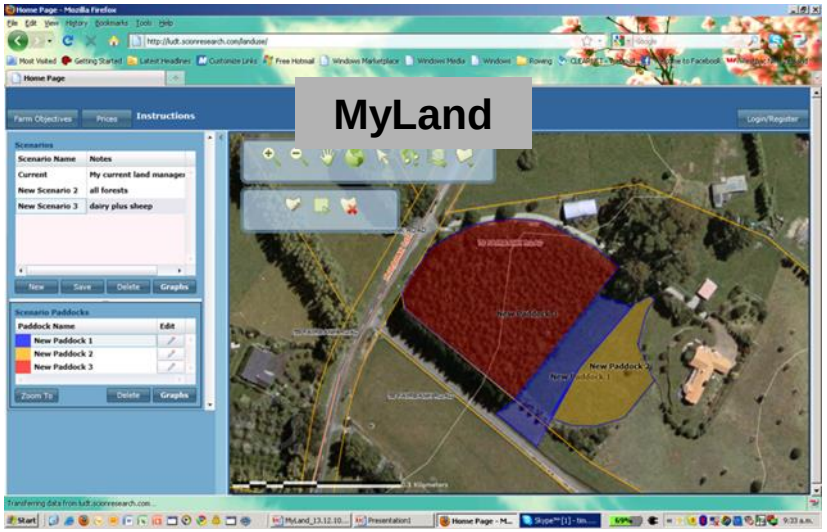




Carbon Predictor



Octopus

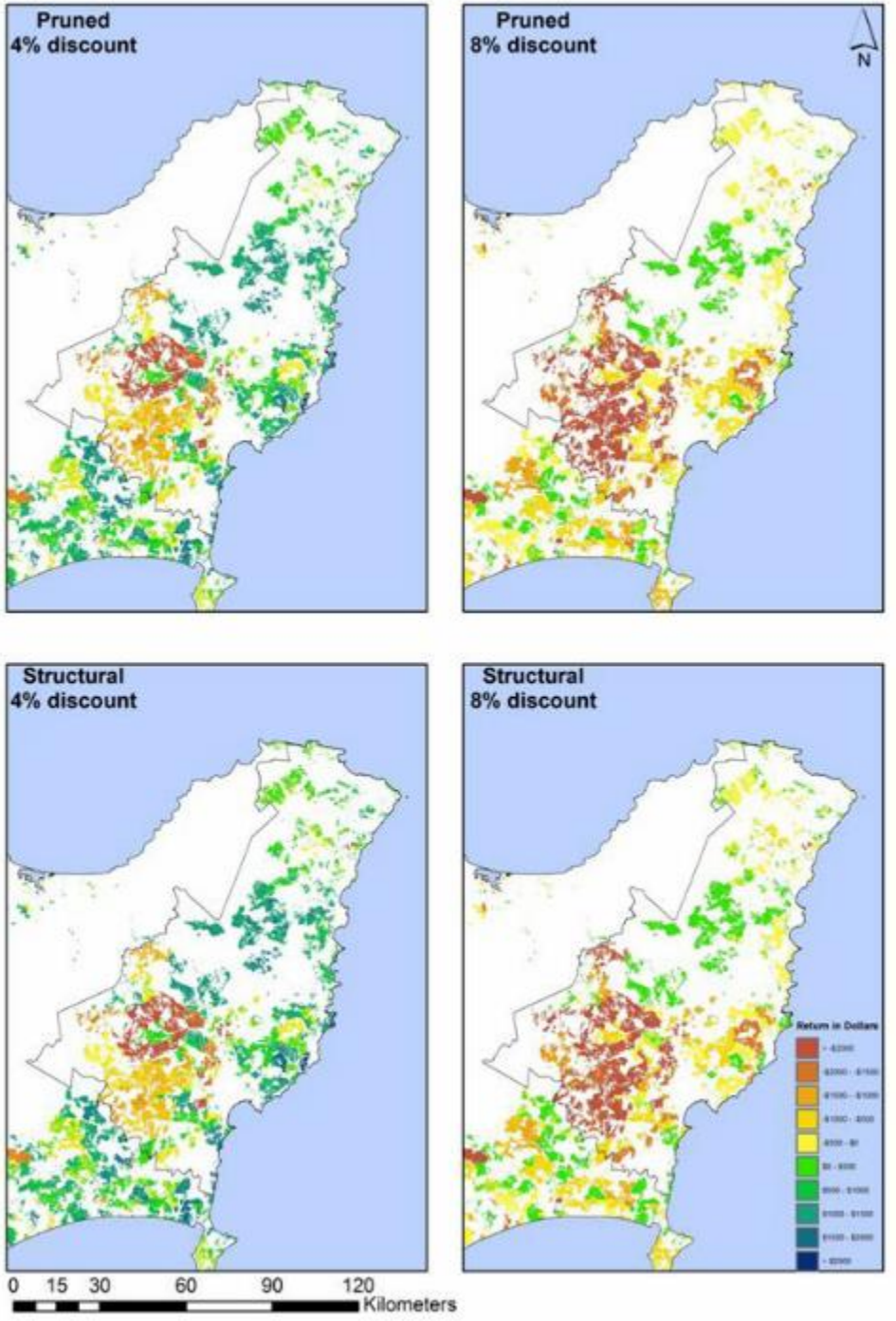


Regional Economic Forestry Scenarios

- Environmental data
- Forestry Costs
  - Variable regimes
- Valuation data
  - Land
  - Forest Products
  - Forest Ecosystem Services
- Transport networks
- Processing Locations

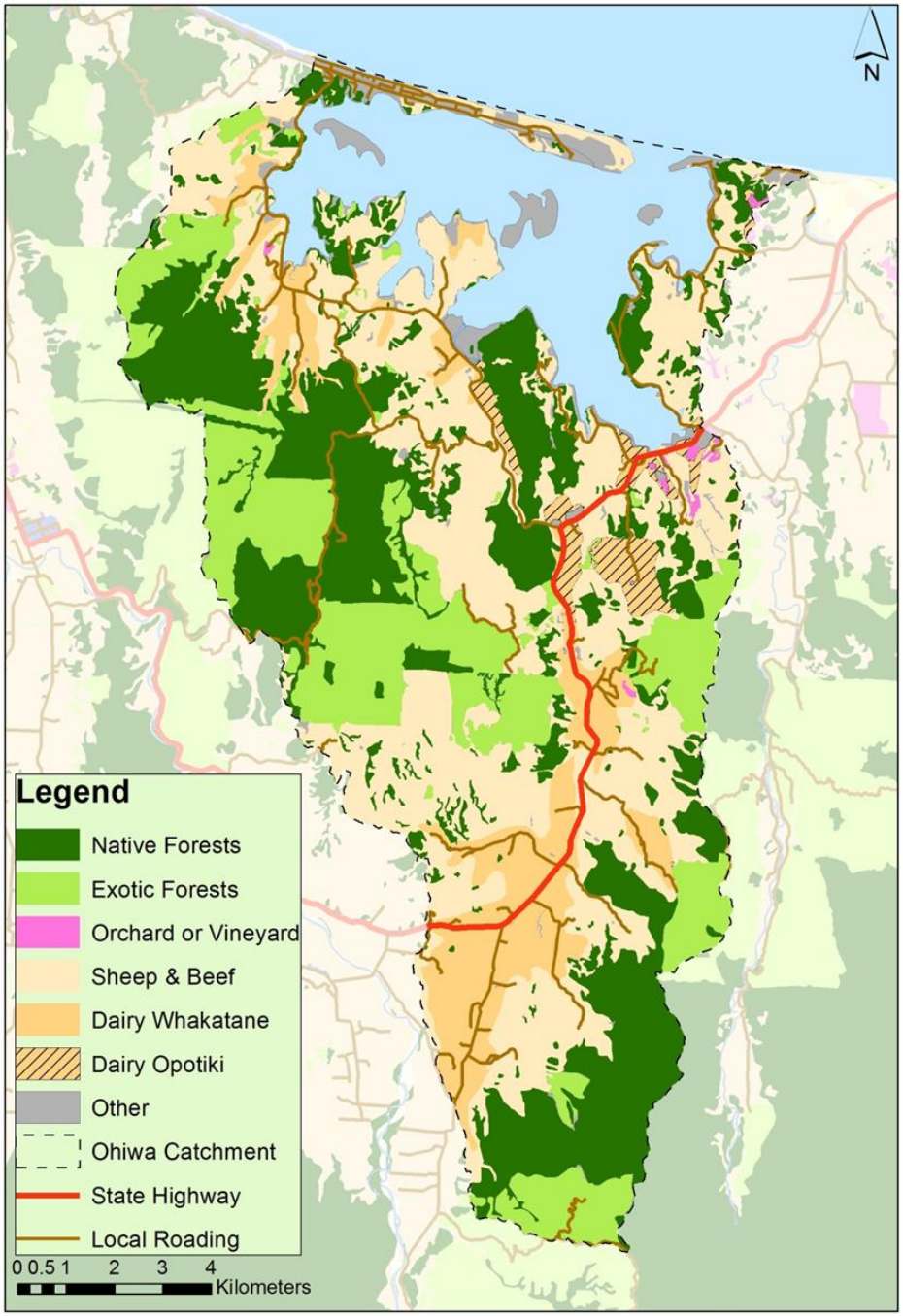
Full value and returns at any given location

Forest Investment Finder
http://prezi.com/vbuofvrbk7nb/fifindustry/



Ecosystem Services and multiple land uses

- Catchment scale land use planning
  - Impacts analysis
- Better understanding of ES values in a catchment
  - milk, meat, timber, fruits
  - C sequestration, erosion
  - recreation, spp. conservation
- Estimate ES values of key land uses
  - Dairy, S&B, Horticulture
  - **Planted forests**
  - Native forests



- Perceptions
- Policy Certainty and Equity
- Land Value
- Investment capital
- Land competition
- Scale and distance

OVERCOMING OBSTACLES TO NEW FORESTRY

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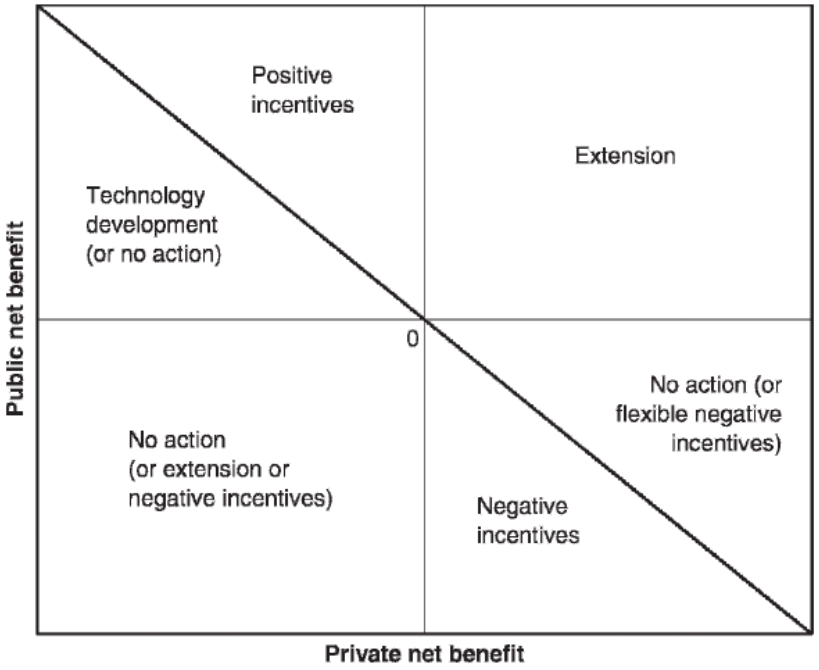
‘Wants’

Runanga Chair

Investor

Farmer

Forester



From Pannell 2008

Planner

Rural Community

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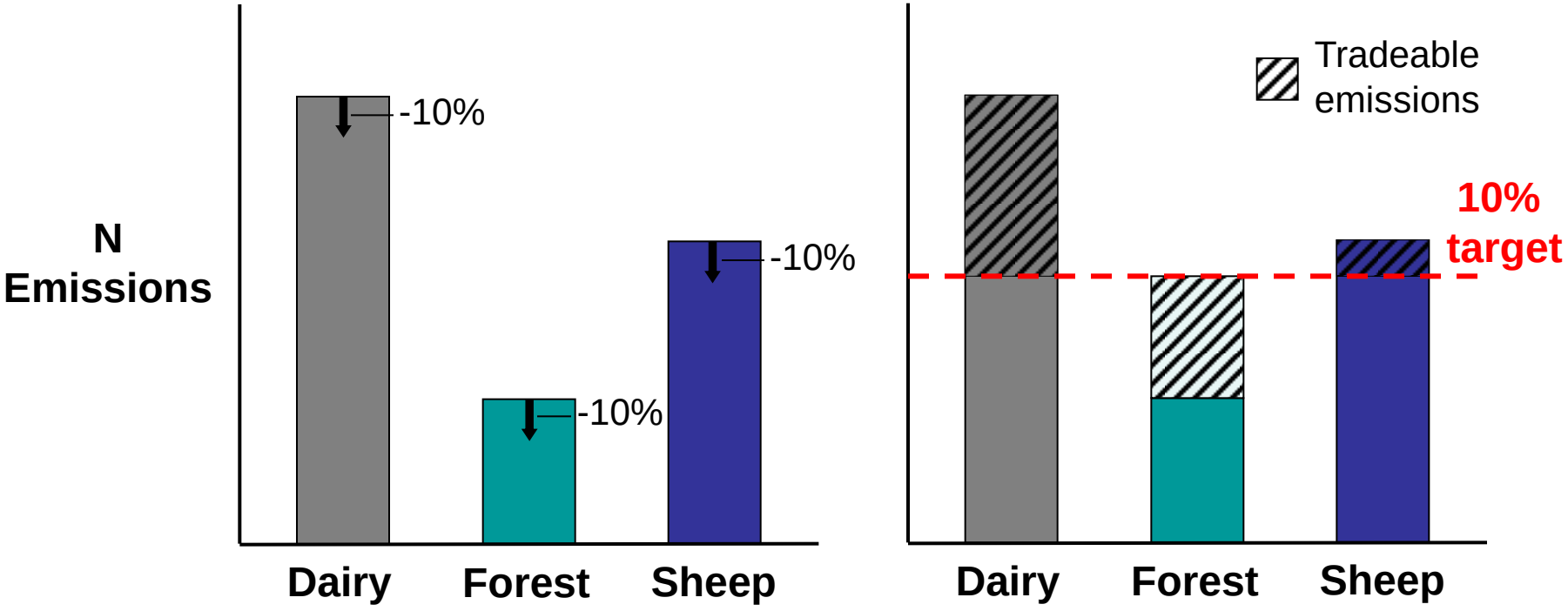
Grandparenting

Averaging



Rigid land use pattern

Evolutionary land use pattern

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Summary

- Forestry a very valuable land use
  - Forests are far more than ‘radiata blanket’
- Key component of a land use mosaic
- Many environmental benefits on top of the timber economics
- Forestry has a continuing key role to play in BOP