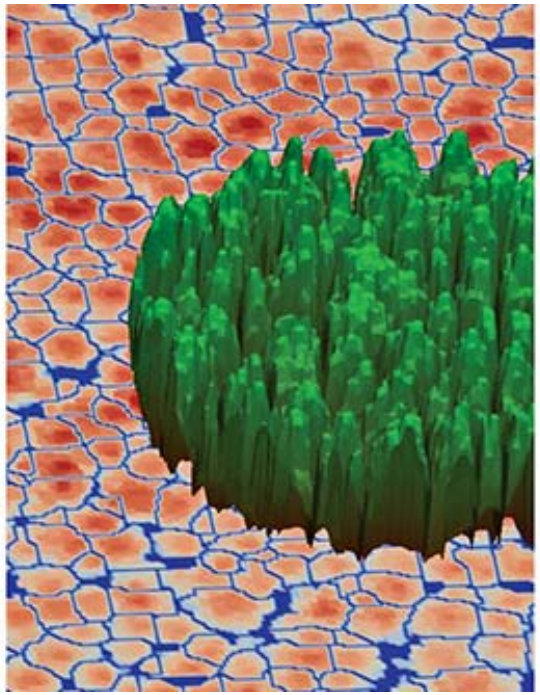
Growing confidence in forestry's future Research Programme

SCION forests · products · innovation

Sustainable Intensification – how far can we go?

Tim Payn



supported by forestgrowers commodity levy

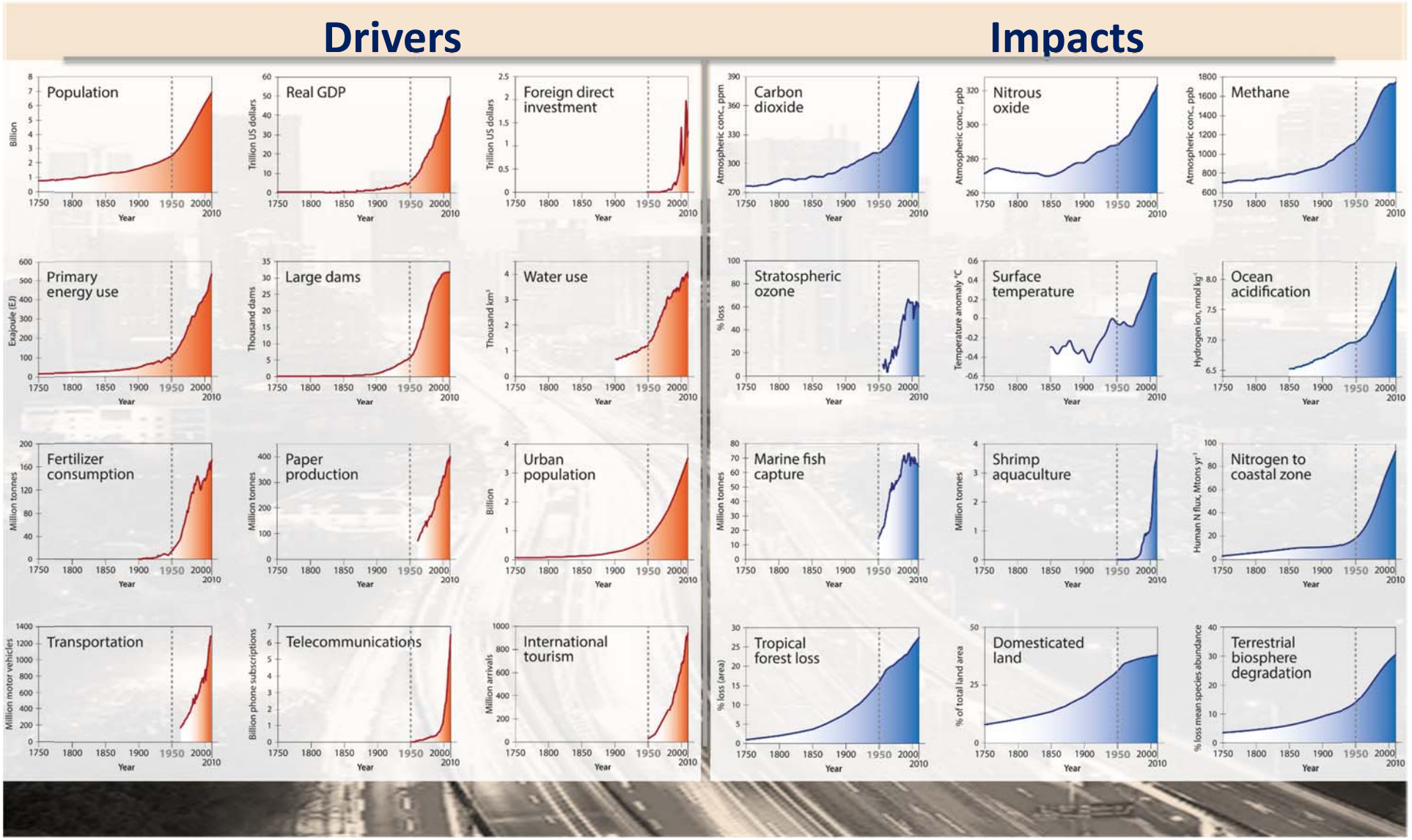
FOREST OWNERS ASSOCIATION

OUTLINE

- GLOBAL TRENDS
- NATIONAL TRENDS
- APPROACHES TO INTENSIFICATION
- TWO EXAMPLES

GLOBAL TRENDS

The Great Acceleration



futureearth

The 2030 Agenda for Sustainable Development

PARIS2015

UN CLIMATE CHANGE CONFERENCE

COP21·CMP11

PARIS CLIMATE AGREEMENT

Historical document that legally binds the whole World to participate in climate change fight.

196 countries
Adopted the Agreement
officially recognizing human influence on climate

Finance
Rich countries will provide minimum of **$100 billion** to developing ones for climate change adaptation by 2020

Will come into force by 2020
If signed by **55 countries** covering **55%** of global emissions

Goal
Holding the increase in the global average temperature well below
2°C
Pursue efforts to limit the temperature increase to
1.5°C

5 years
Ambitious
Every 5 years countries shall revise their emissions reduction targets and measures

Climate neutrality 2050
The balance between emissions and sinks should be reached in the second half of XXI century

Climate damage
For the first time ever the Agreement defines climate loss and damage terms **but** liability and compensation are not mentioned

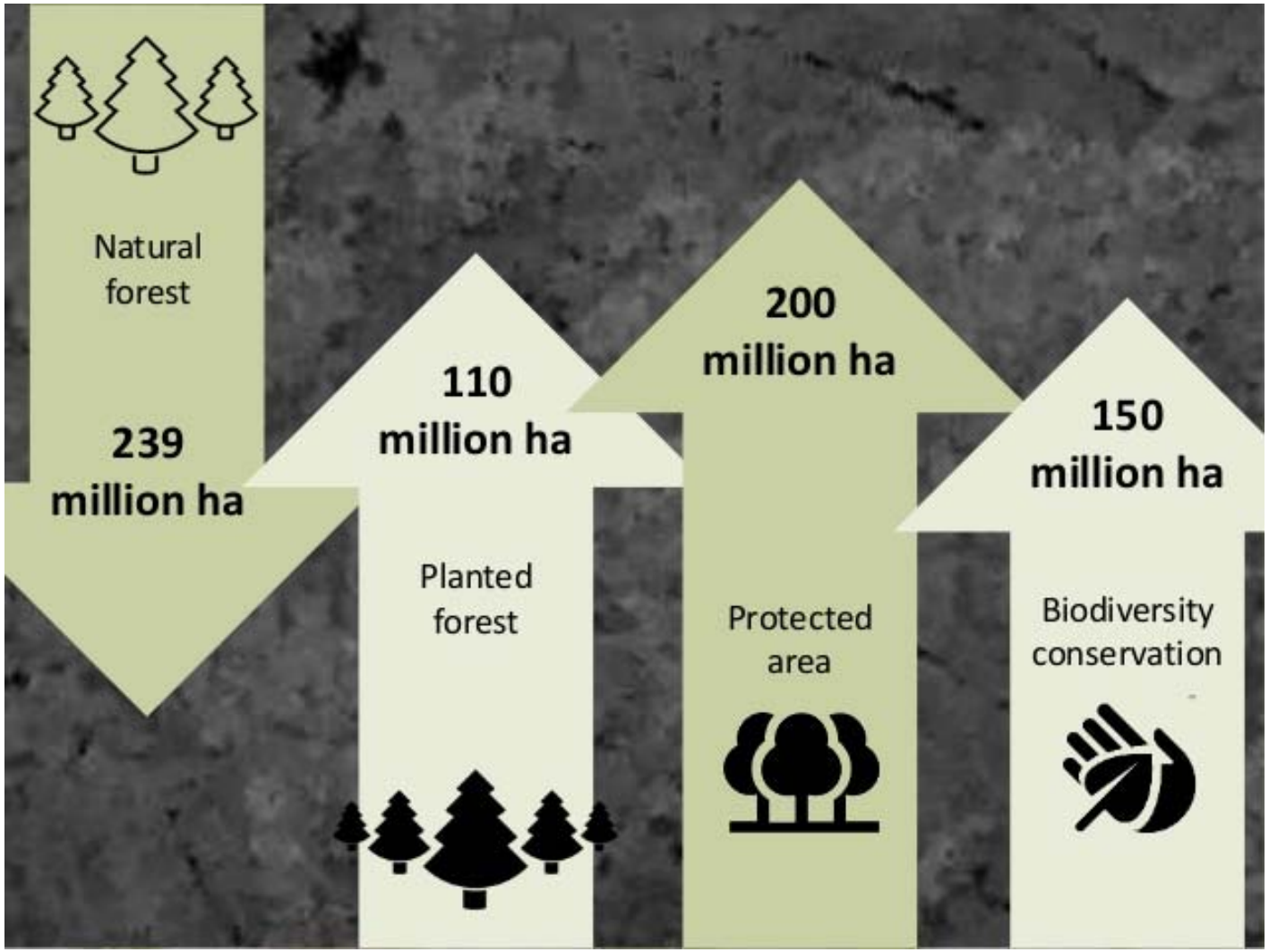
Clean technologies
The Agreement urges to speed up clean tech development and international technology transfer

Role of forests
The Agreement binds saving and increasing forest area in order to capture GHGs from the atmosphere

@CLIMATERUSSIA CLIMATERUSSIA.RU

World Business Council for Sustainable Development

Global Forest Trends 1995-2015



http://www.fao.org/3/a-i4895e/index.html

Global planted forest trends

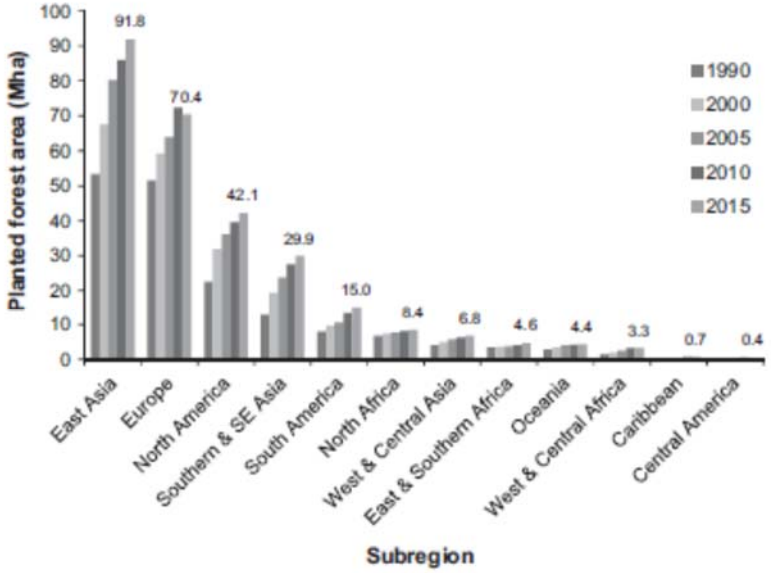


Fig. 3. Changes in Planted Forest Area by FAO subregion 1990–2015.

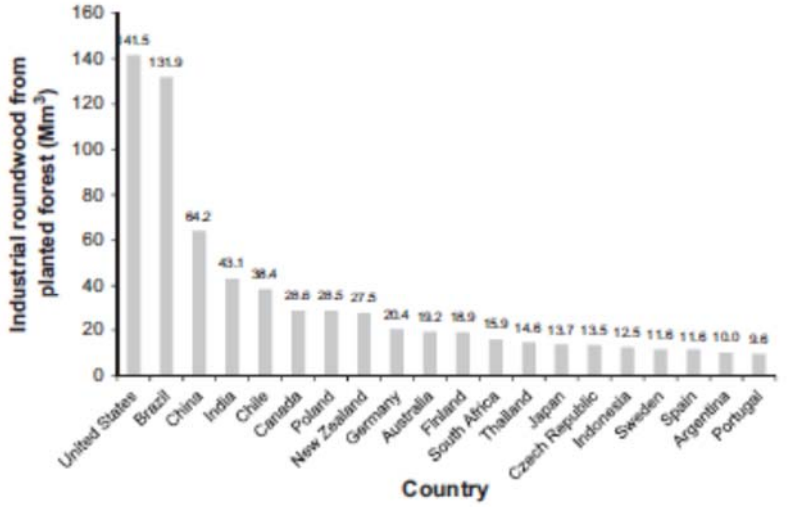


Fig. 7. The world's top 20 producers of industrial roundwood from planted forests in 2012.

Contents lists available at ScienceDirect

Forest Ecology and Management

journal homepage: www.elsevier.com/locate/foreco

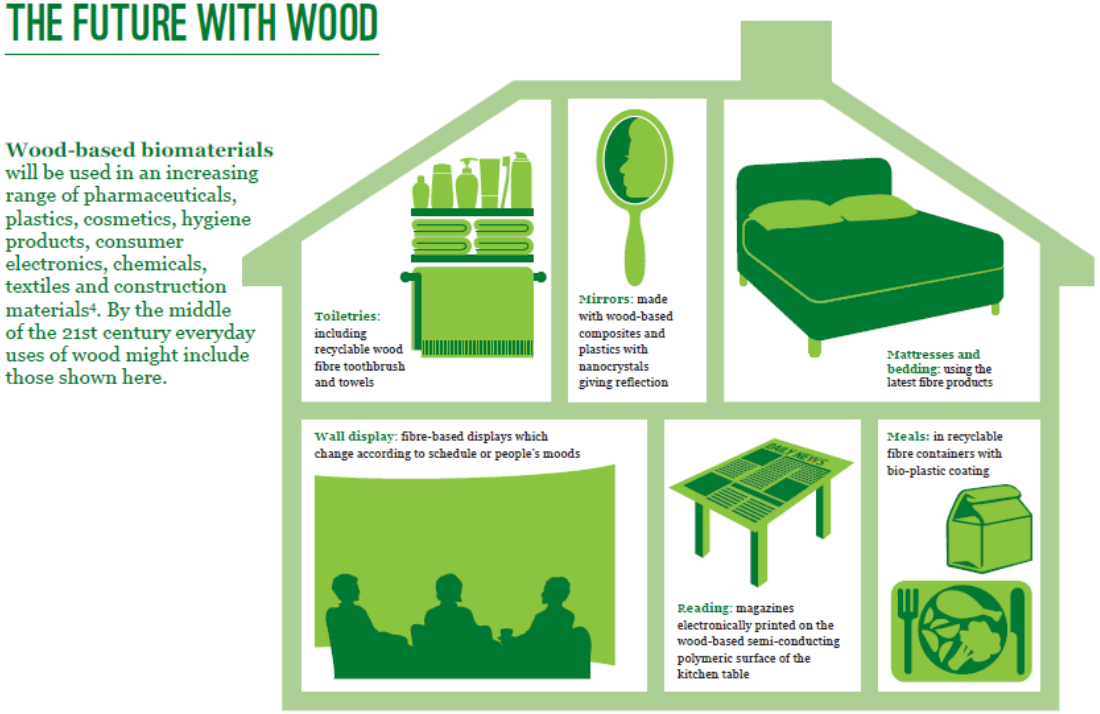
Changes in planted forests and future global implications ☆

Tim Payn [a,*], Jean-Michel Carnus [b], Peter Freer-Smith [c], Mark Kimberley [a], Walter Kollert [d], Shirong Liu [e], Christophe Orazio [f], Luiz Rodriguez [g], Luis Neves Silva [h], Michael J. Wingfield [i]

But there will be a shortage of fibre

>300% more fibre needed

"Humanity will likely use more wood in more ways as the future unfolds. If production forests are managed sustainably and wood products are used efficiently or replace others with a heavier footprint, this should be good for the planet." *(WWF 2012 The Living Forest report)*

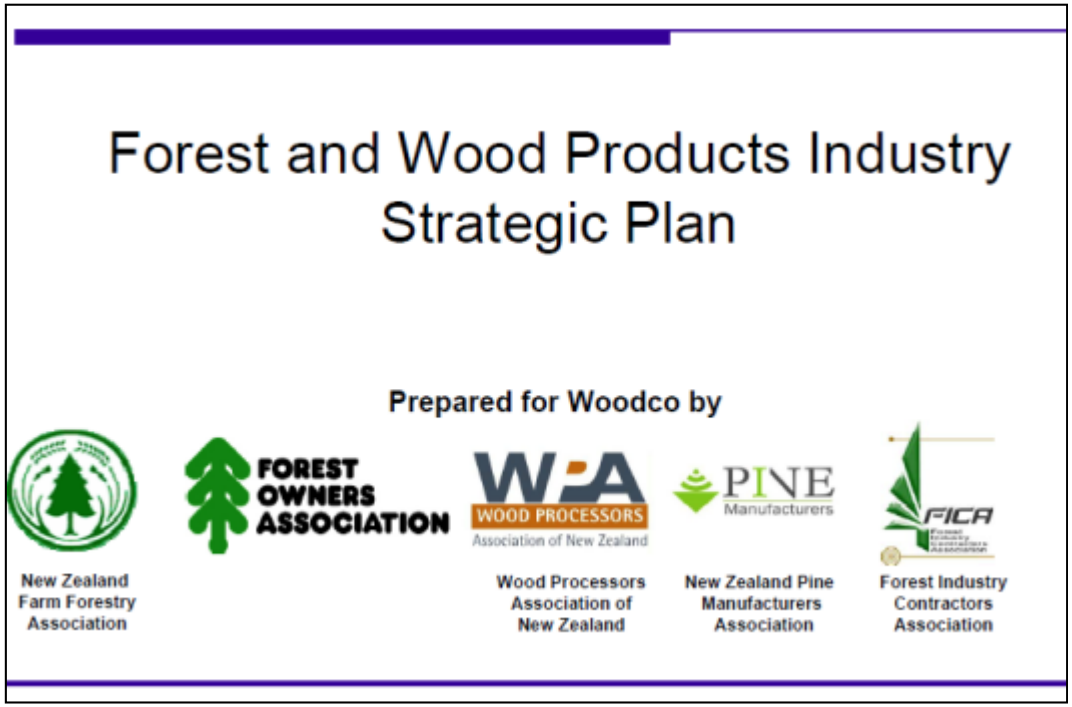


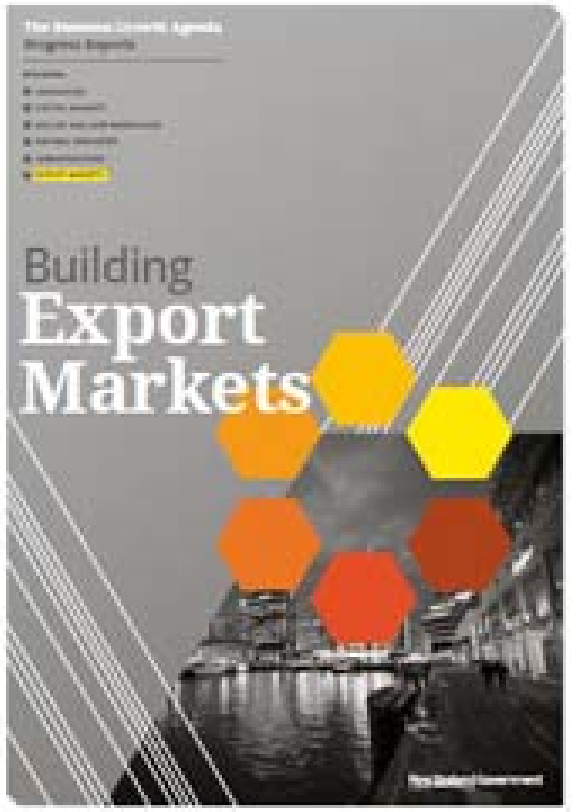
	FAO 2010	LIVING FORESTS MODEL 2030		2050	
		Do Nothing	Bioenergy Plus	Do Nothing	Bioenergy Plus
Saw logs & veneer logs	853	1,444	1,444	1,763	1,773
Pulpwood*	527	754	754	905	893
her industrial roundwood**	153	153	153	153	153
Energy wood	1,868	2,753	3,138	6,317	8,209
Household fuelwood		2,064	2,064	2,218	2,054
Total wood supply	3,401	7,168	7,553	11,356	13,082

Units: millions of cubic metres (roundwood equivalent)

NATIONAL TRENDS

Forestry Industry Vision
$12b exports by 2022





Government – Increase exports from 30% (2012) to 40% GDP by 2025

SCION
forests · products · innovation

Sustained growth from Natural Resources matters

Increasing value from our freshwater assets

Increasing productivity while maintaining and improving overall water quality.

Making the most of our abundant energy and minerals potential

Encouraging environmentally responsible development and efficient use of the country's diverse energy resources.

Building growth from more efficient land and resource use

Increasing sustainable resource use and improving sector productivity while creating a dynamic, responsive and effective system to manage our [illegible]

Realising greater value from our marine and aquaculture resources

Making the most of the considerable opportunities for New Zealand to gain much greater value from its extensive marine and aquaculture resources.

Government efforts to build economic growth through sustainable use of natural resources in seven areas:

Maintaining and advancing biodiversity

Healthy functioning ecosystems supplying and maintaining the natural capital we need to prosper.

Harnessing Māori resources productive potential

Further developing the productive potential of Māori resource-based industries to help drive New Zealand's economic performance.

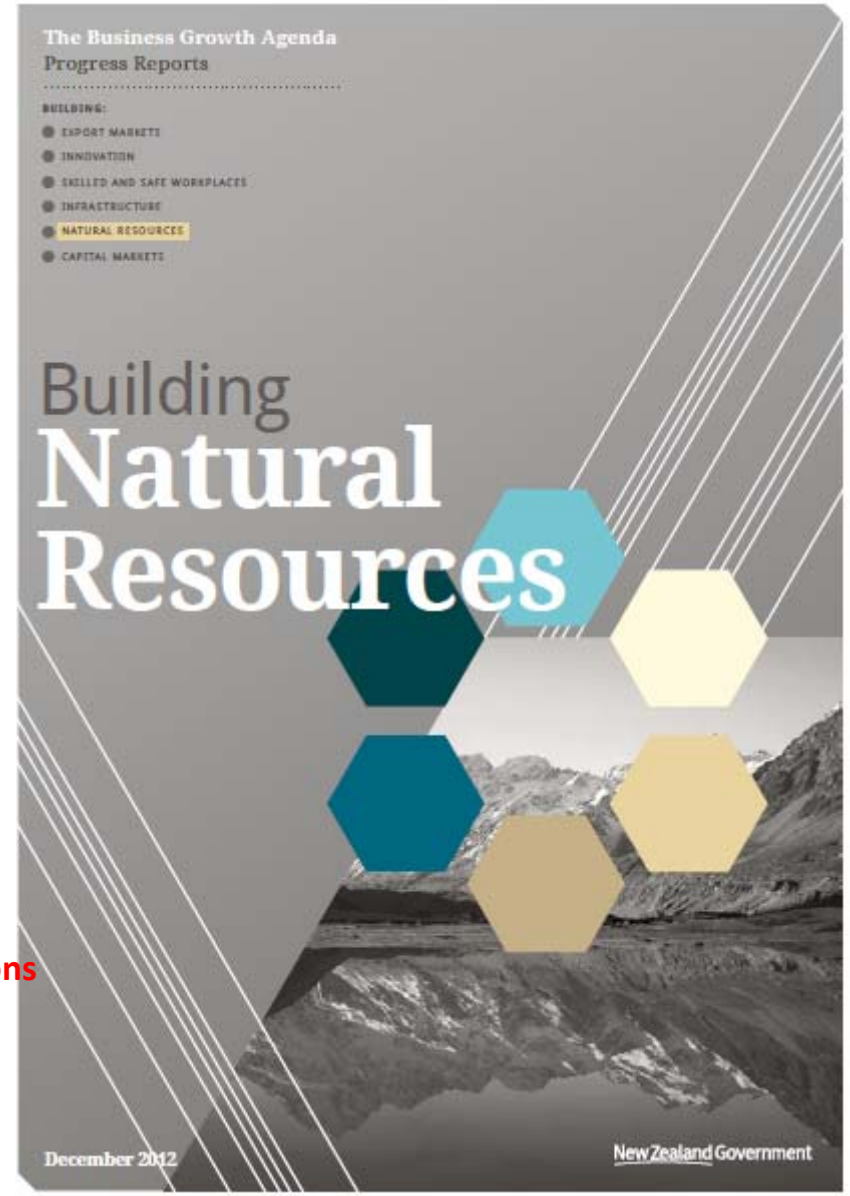
Transitioning to a low-emissions economy

Incentivising New Zealand businesses and households to transition to a low-emissions [illegible] productivity.

Efficient land use

Maintain Natural Capital

Low emissions economy



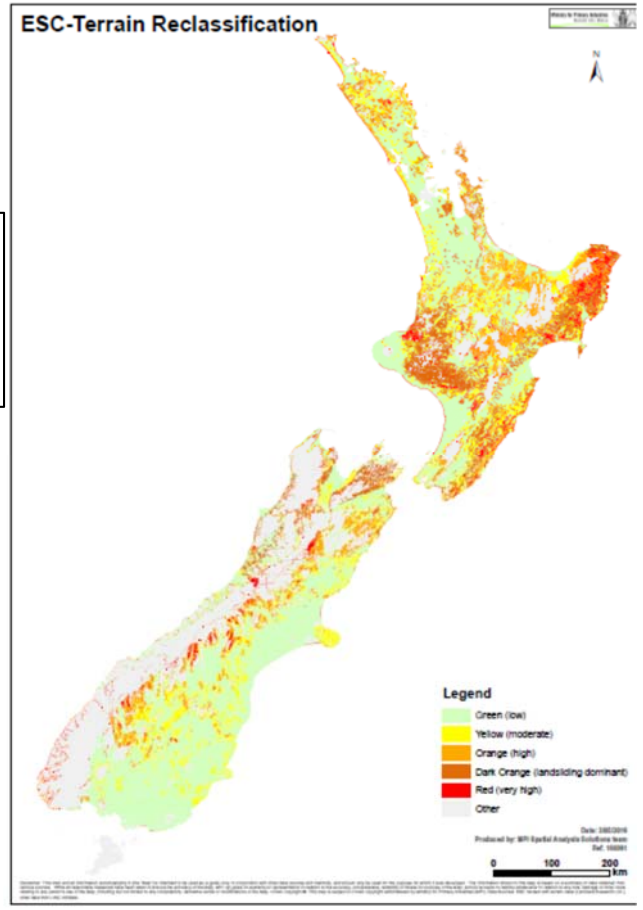
RMA: Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

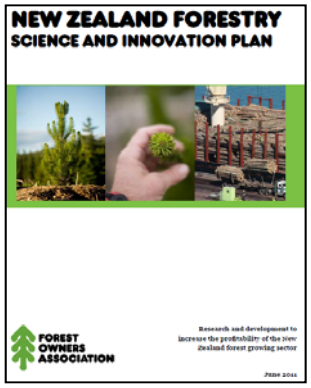
PURE ADVANTAGE *Our Forest Future*

NATIONAL POLICY STATEMENT for Freshwater Management 2014

New Zealand Emissions Trading Scheme Review 2015/16: Discussion document and call for written submissions

National Environmental Standard





Developing the proposed National Policy Statement on Indigenous Biodiversity

FOREST INDUSTRY SAFETY COUNCIL
TOGETHER TOWARDS ZERO

HSNO Act: GM organisms

Forestry: Reasons to be cheerful

- Increasing wood supply
- Increasing demand globally
- Increasing world population
- New carbon markets
- Good governance and investment environment
- Stable environmental regulation – RMA
- Low biosecurity risks
- Low fire area impacts
- Low wind damage
- Good quality resource
- Improving genetics and productivity

More reasons to be cheerful

- New Zealand Forest Accord
- New Zealand Climate Change Accord
- Principles of Plantation Management
- Environmental Code of Practice
- NZIF Forestry Handbook
- FOA Harvesting Manual
- Primary Sector Water Partnership
- National Environmental Standard for Planted Forests
- New Zealand Forestry Standard NZ4708
- Forest certification
  - 51% of planted forest area
- Promoting benefits
  - NZ Wood
  - Montreal Process C&I reports
  - GHG footprinting
- Public Goods – ecosystem services for the wider community

FSC FOREST STEWARDSHIP COUNCIL
Because forests matter

NZ WOOD
For a better world

Montreal Process

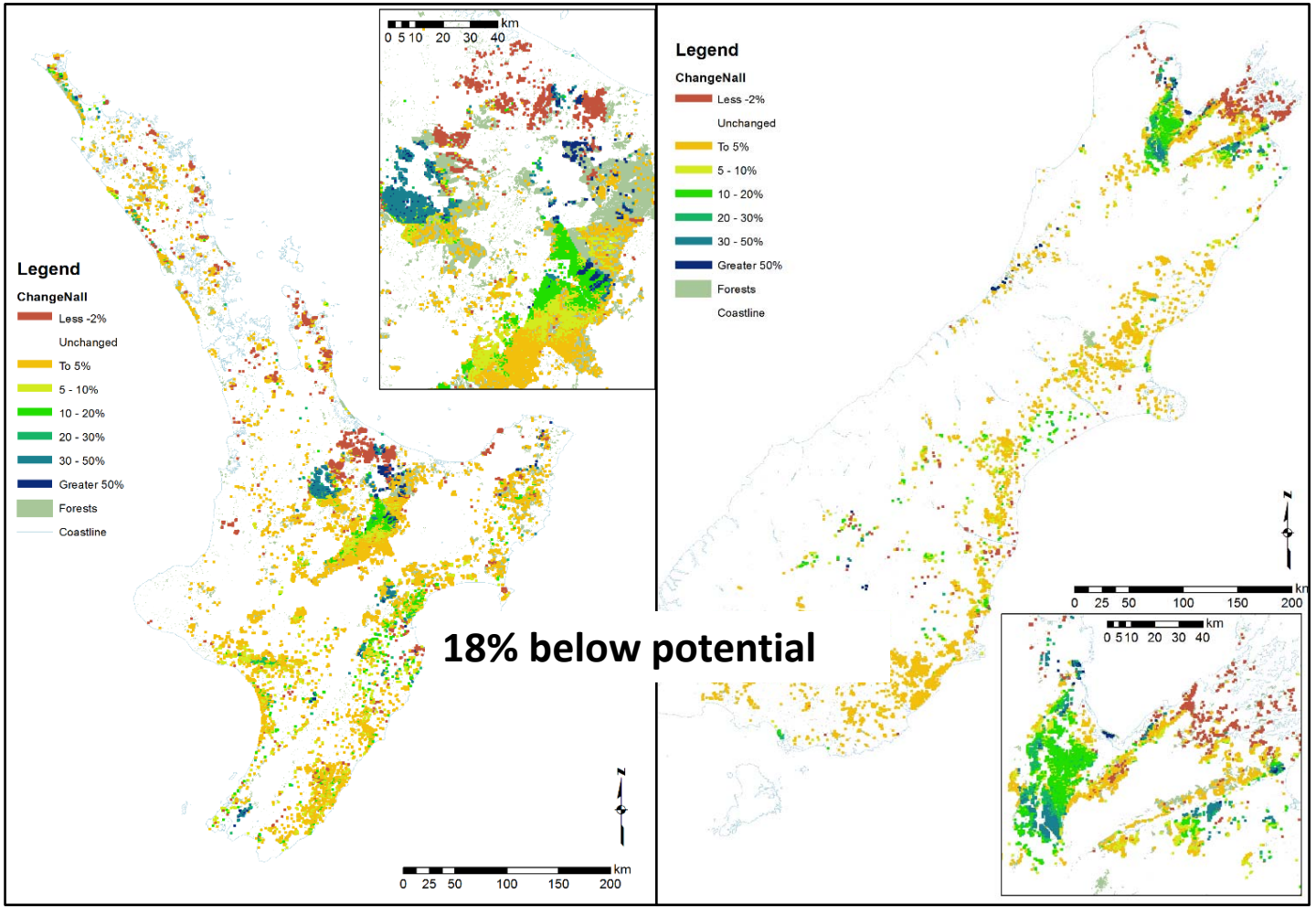
PEFC

HOW RISKY IS IT?

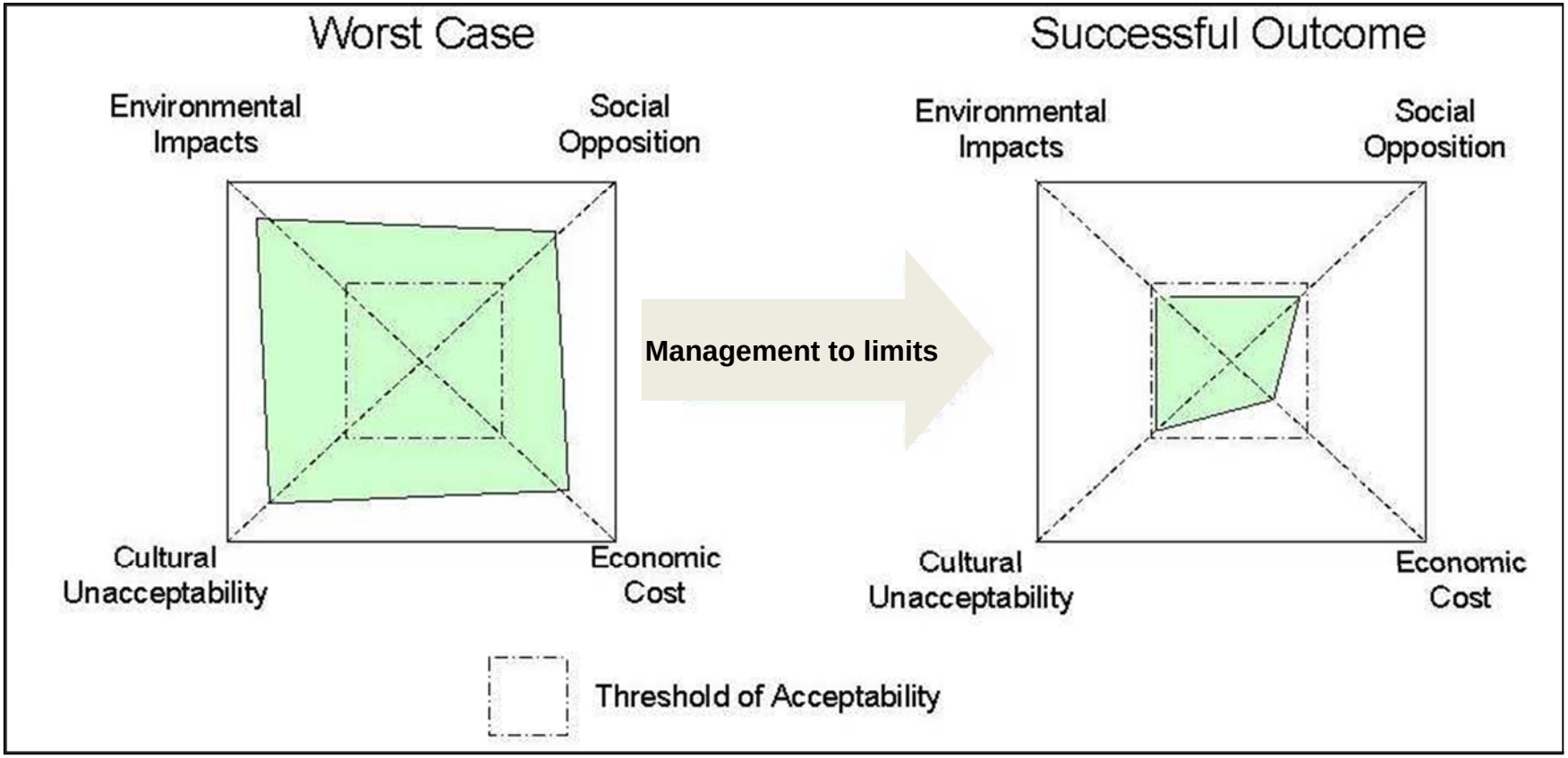
- CAN WE INTENSIFY?
- SHOULD WE INTENSIFY?
- WHAT MIGHT STOP US?

SO WHAT ABOUT INTENSIFICATION?

The potential is there



Sustainable Intensification or Production within limits



What don’t we know – what risks are there?

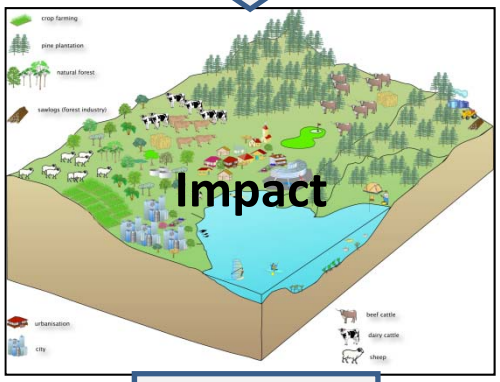
- What our markets will want in the future
- What will happen to the environment if we intensify
- What unintended consequences may occur
- What our current markets think of us
- How we are perceived by our neighbours
- How perceptions are affecting our ability to do forestry
- How forestry policy and regulation will change into the future
- The scale and intensity of climate change
- What land values will do in the future
- Whether we will have enough skilled people for our forests
- How export prices and exchange rates will fluctuate

A Risk Wheel

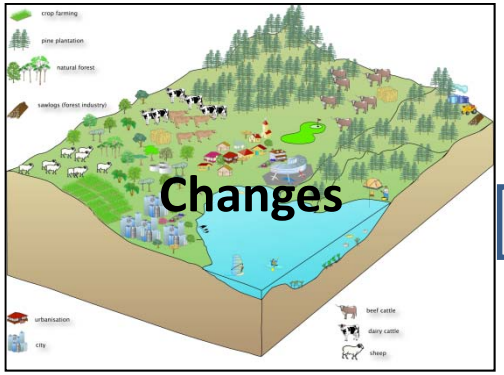

Economics
Markets
Regulation
Health and Safety
Community
Risk
Soil and Water
Productivity
Climate and Carbon
Biodiversity
Forest Health

Drivers:
Pressure:
State:
Impact:
Response:
Benefits

Pressure:
Climate
Perceptions
Economics
Regulations



Response



Different:
Land Use Patterns
Economic Returns
Environmental Impacts
Social and Cultural Impacts

Interconnectedness of the forest system

Criterion 1: Conservation of biological diversity

1.1. Ecosystem Diversity

1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure

1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage

1.1.c Fragmentation of forests

1.2. Species Diversity

Species

1.2.c Status of on site and off site efforts focused on conservation of species diversity

1.3. Genetic Diversity

1.3.a Number and geographic distribution of forest-associated species at risk of losing genetic variation and locally adapted genotypes

1.3.b Population levels of selected representative forest-associated species to describe genetic diversity

1.3.c Status of on site and off site efforts focused on conservation of genetic diversity

Criterion 2: Maintenance of productive capacity of forest ecosystems

2.a Area and percent of forest land and net area of forest land available for wood production

2.b Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production

2.c Area, percent, and growing stock of plantations of native and exotic species

2.d Annual harvest of wood products by volume and as a percentage of net growth or sustained yield

2.e Annual harvest of non-wood forest products

Criterion 3: Maintenance of forest ecosystem health and vitality

3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive alien species) beyond reference conditions

3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions

Criterion 4: Conservation and maintenance of soil and water resources

4.1 Protective function

4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources

4.2 Soil

Soil

4.3 Water

Water

Criterion 5: Maintenance of forest contribution to global carbon cycles

Carbon

5.c Avoided fossil fuel carbon emissions by using forest biomass for energy

Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits

6.1 Production

Target

6.1.d Total and *per capita* consumption of wood and wood products in round wood equivalents

6.1.e Total and *per capita* consumption of non-wood forest products

6.1.f Value and volume in round wood equivalents of exports and imports of wood products

6.1.g Value of exports and imports of non-wood forest products

6.1.h Exports as a share of wood and wood products production, and imports as a share of wood and wood products consumption

6.1.i Recovery or recycling of forest products as a percent of total forest products consumption

6.2 Investment in the forest sector

6.2.a Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation and tourism

6.2.b Annual investment and expenditure in forest-related research, extension and development, and education

6.3 Employment and community needs

Employment

6.3.c Resilience of forest-dependent communities

6.3.d Area and percent of forests used for subsistence purposes

Community

6.4 Recreation and tourism

6.4.a Area and percent of forests available and/or managed for public recreation and tourism

6.4.b Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available

6.5 Cultural, social and spiritual needs and values

6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values

6.5.bThe importance of forests to people

Criterion 7: Legal, institutional and economic frameworks for forest conservation and sustainable management

Regulation

7.1.b Cross sectoral policy and programme coordination

7.2.a Taxation and other economic strategies that affect sustainable management of forests

7.3.a Clarity and security of land and resource tenure and property rights

7.3.b Enforcement of laws related to forests

7.4.a Programmes, services and other resources supporting the sustainable management of forests

7.4.b Development and application of research and technologies for the sustainable management of forests

7.5.a Partnerships to promote the sustainable management of forests

7.5.b Public participation and conflict resolution in forest-related decision making

7.5.c Monitoring, assessment and reporting on progress towards sustainable management of forests

www.montrealprocess.org

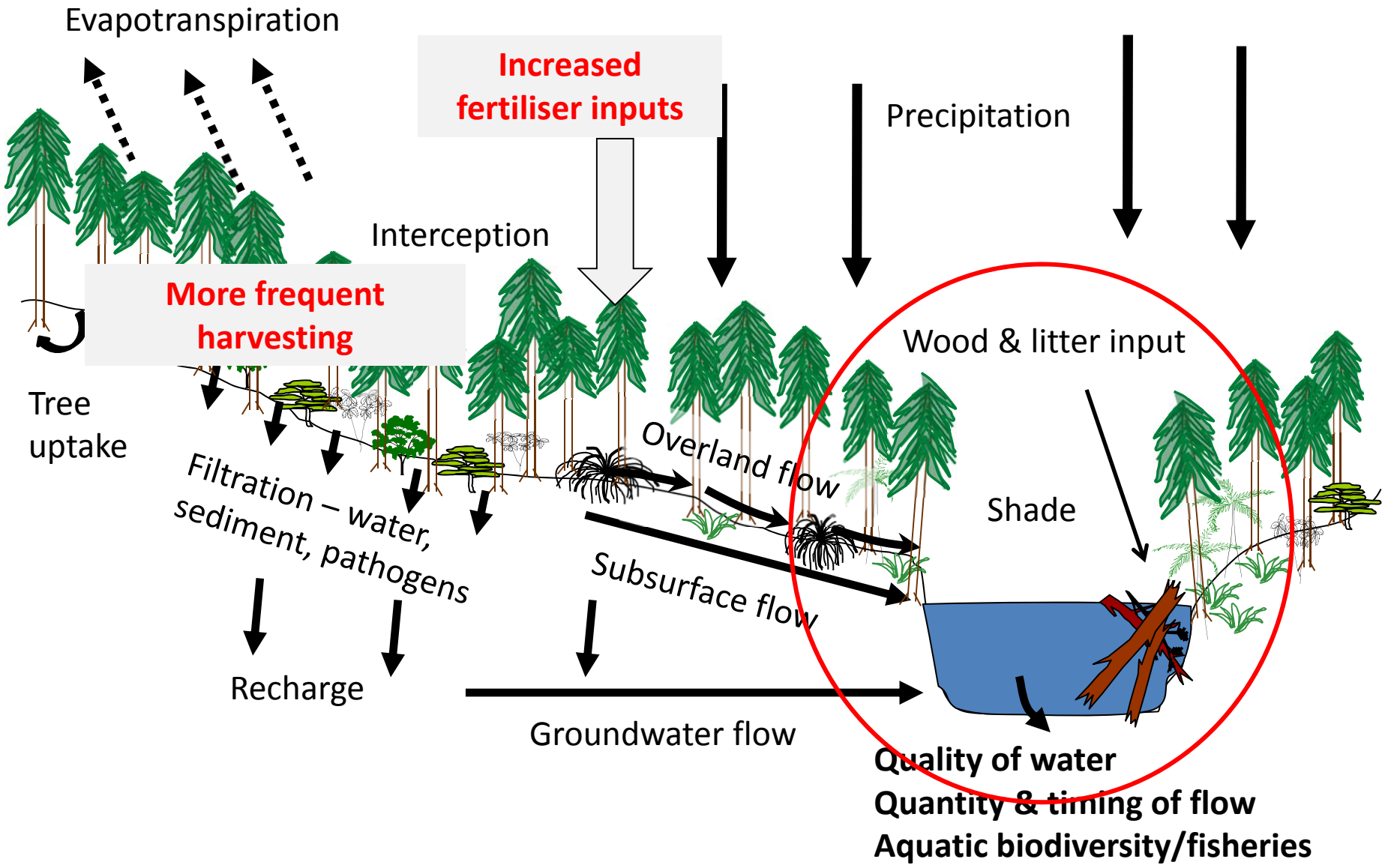
What evidence do we need to support intensification decisions?

- Enough to answer questions about
  - Impacts
  - Financial implications
  - All risks
    - Both within and outside the forest
  - Any unintended consequences

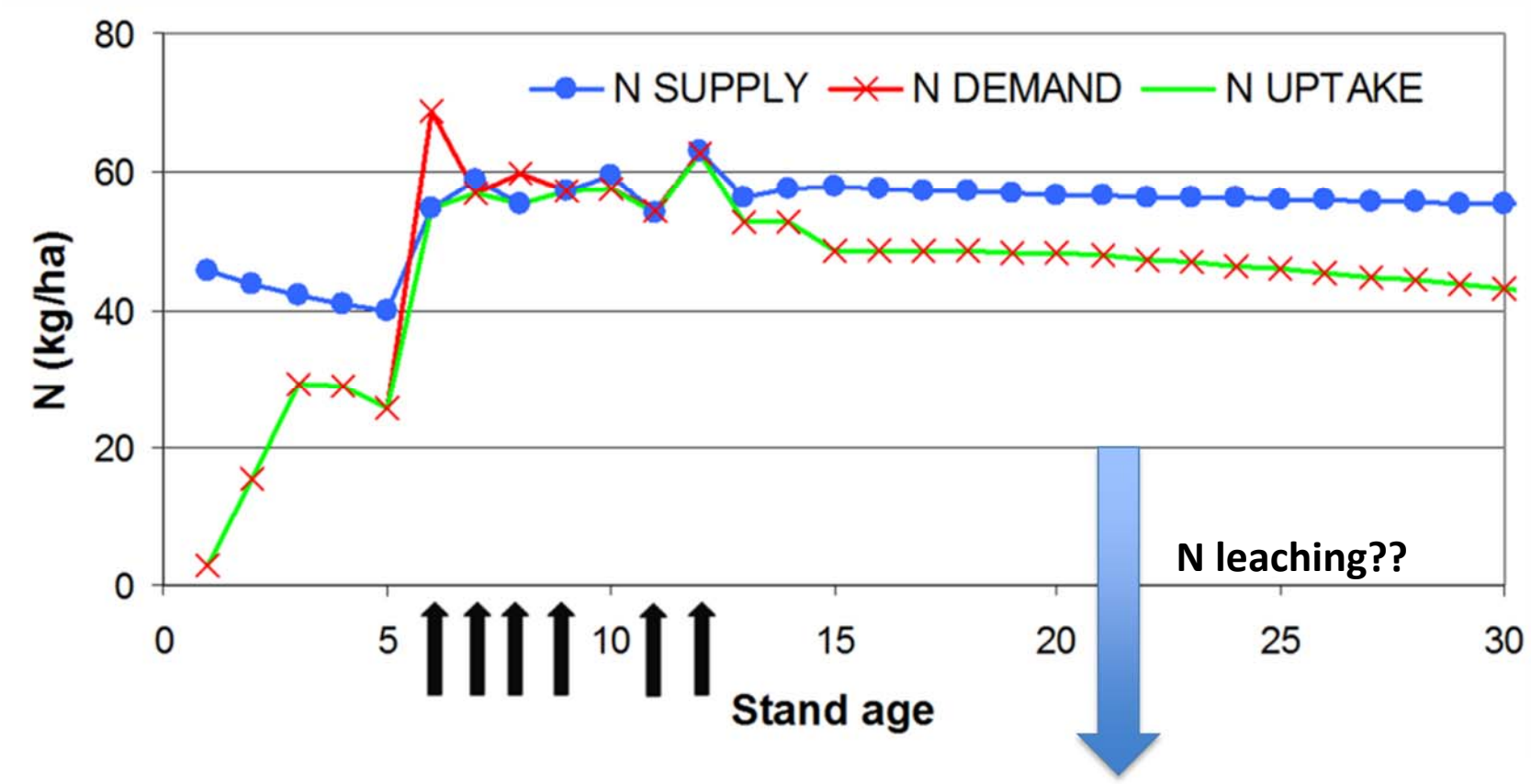
- FERTILISATION
- 1.3 MILLION HECTARES OF NEW CARBON FORESTS

TWO EXAMPLES

Fertilisation within existing forests

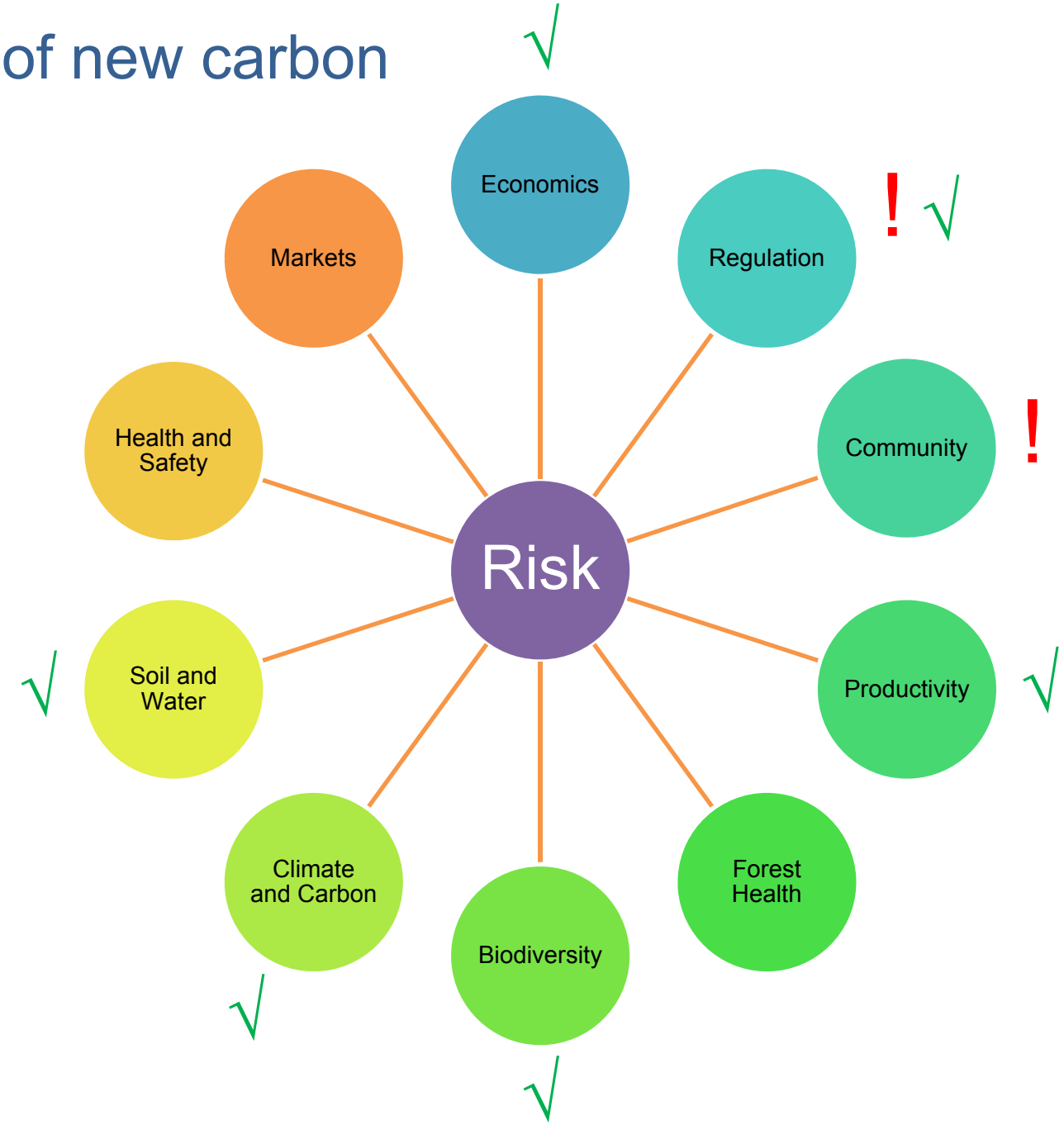


Nitrogen supply, demand, and leaching



Fertilisation

1.3m ha of new carbon forests



In summary

- Can we intensify?
  - Yes we can
- Should we intensify?
  - Yes if we can do it without adverse impacts
- What might stop us?
  - Any of the risk factors identified
- How should we approach intensification?
  - Thoughtfully, Cautiously
  - Analysis of risk
  - Dialogue

$$sf(x) = a_0 + \sum_{n=1}^{\infty}\left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L}\right)s$$

Growing confidence in forestry's future Research Programme

SCION forests · products · innovation

Tim Payn
Principal Scientist
tim.payn@scionresearch.com

http://research.nzfoa.org.nz
www.scionresearch.com
www.gcff.nz

Date:13th May 2016

supported by forestgrowers commodity levy

FOREST OWNERS ASSOCIATION