

INNOVATION & TECHNOLOGY SOLUTIONS IN FORESTRY

**ADAPTING TO CLIMATE CHANGE
MANAGING INVASIVE PESTS**

- A FRANCE-NEW ZEALAND WEBINAR -

Opening words





Vincent HEBRAIL

Counsellor (Agriculture) - Embassy of France to New Zealand

Challenges and solutions in France





Jean-Michel Carnus

Voluntary member - Association France Aotearoa Science, Technology, Innovation
(FAST!)



Christophe ORAZIO

Director
European Institute of Planted Forests
(IEFC)



Hervé JACTEL

Principal scientist
National Research Institute for Agriculture,
Food and the Environment (INRAE)

About INRAe and IEFC

INRAE

- Main research institute in France for agronomy and Forestry
- 15000 employees
- 4 research centres dedicated to forest, ...
- Cover all research field from genetic to social science, ..
- More information on www.inrae.fr

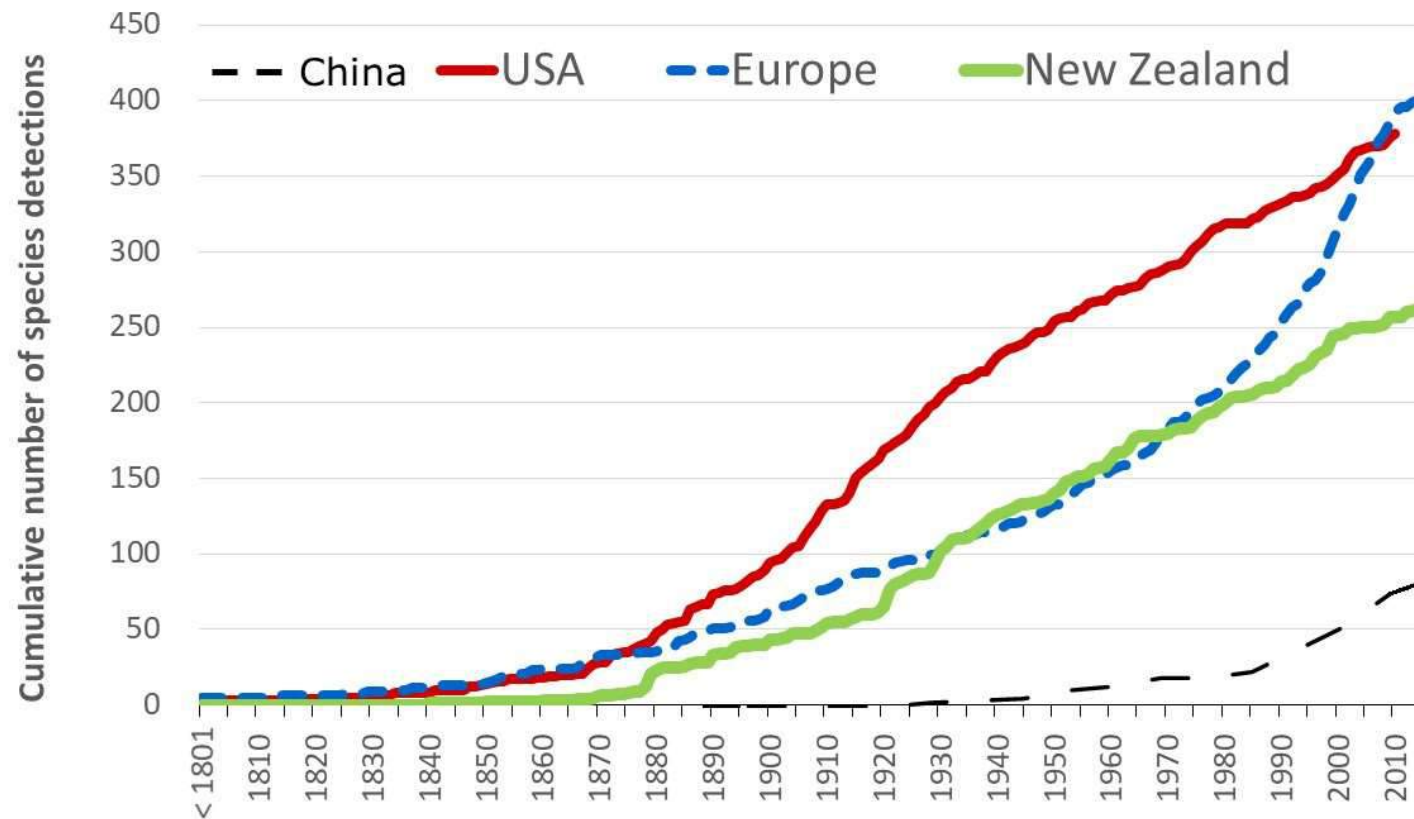


IEFC : European Institute for planted forest

- An NGO dedicated to knowledge exchange between scientists and practitioners
- Main focus on resilience and sustainable management of planted forests
- Facilitate international project and data sharing
- Support maintenance of digital and physical infrastructures
- Join event and publications
- More information on www.plantedforests.org

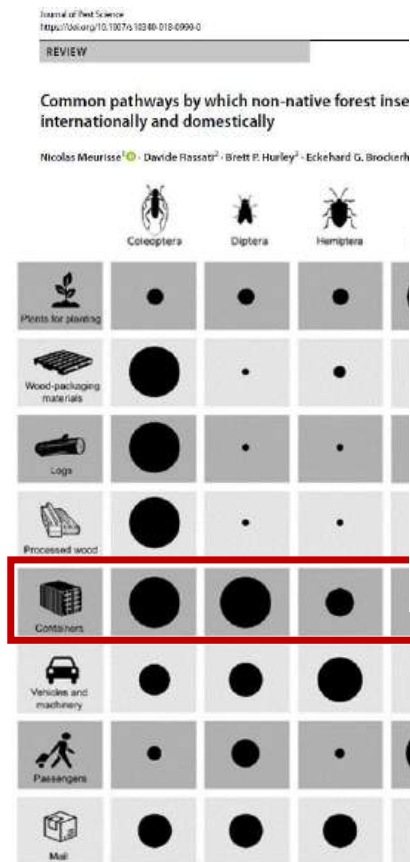


Context: ever more biological invasions in forests



**6 new alien insect species / year
associated with woody plants in Europe**

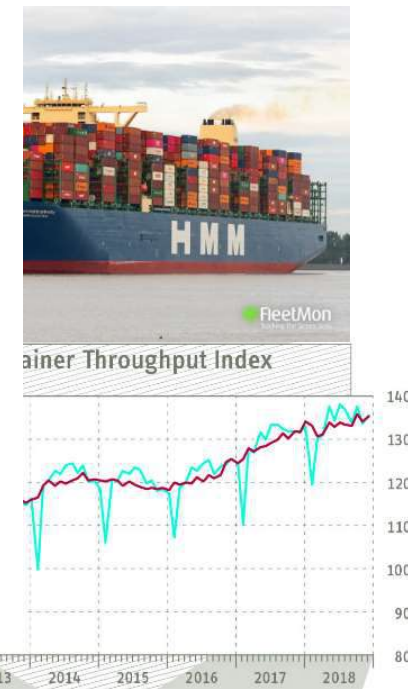
Context: more biological invasions due to sharp increase in globalization and international trade



Context: once established, non-native species are very difficult to manage



It is essential to avoid the introduction and establishment of invasive species

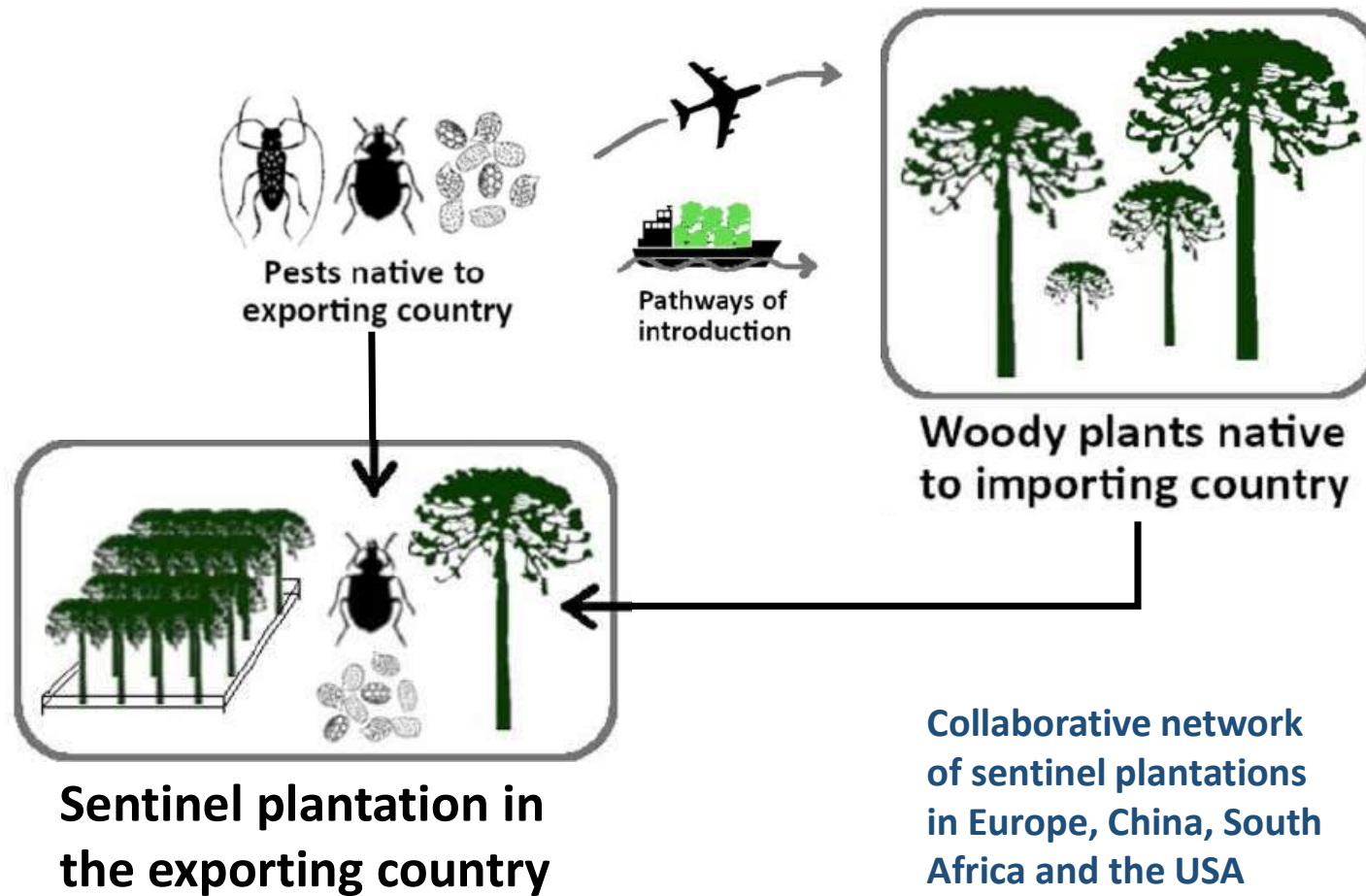


50 M containers / year
< 1% inspected!

1. What could arrive?



Sentinel plantations to identify forest pests before their introduction



2. What is arriving?



Light sticky traps in containers for detection during transport



Light Traps in Shipping Containers: A New Tool for the Early Detection of Insect Alien Species

Matteo Marchioro,^{1,2} Andrea Battisti,² and Massimo Faccoli

3. What has arrived ?



Early detection using generic attractive traps in seaports and airports



multi-component attractive blend



In ports and nearby forests

Detection of non-native bark and wood borers in 85% of the main ports-of-entry in France



*Xylotrechus
stebbingi*



*Xylotrechus
chinensis*



*Trichoferus
campestris*



*Cordylomera
spinicornis*



Euplatypus hintzi



Euplatypus parallelus



Amasa parviseta



Xyleborus affinis

22 species for ca. 4000 specimens!

Roques, comm. pers

IEFC Living Labs on resilience

- **SUPERB- Bocage Forestier** : Promote biodiversity restoration activities in planted forests, assess positive impact of broadleaves hedgerows in Maritime Pine landscape
- Biodiversity, processionary moth reduction, ...
- **FIRE-RES** : Innovative technologies & socio-ecological-economic solutions for fire resilient territories in Europe
Planted forest living lab in Lande of Gascony.



SUPERB

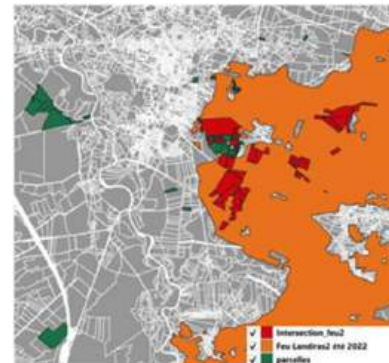
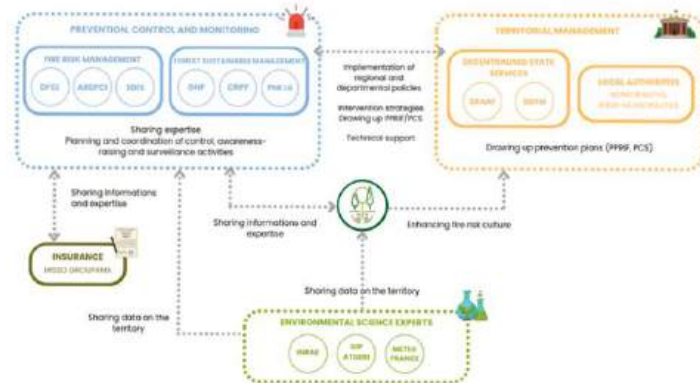
Upscaling Forest Restoration

forest-restoration.eu

@SUPERB_project

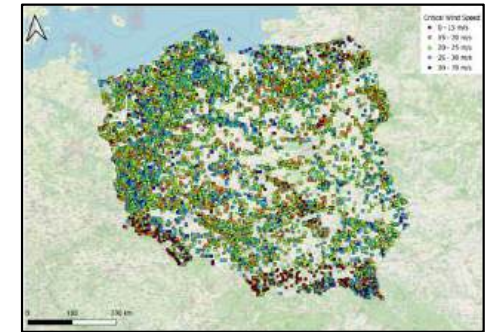


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036849.



IEFC resilience of planted forests

- Wind risk mapping (CLIMB-FOREST) and good practices guide



- Citizen science for forest damages alert and hylobius monitoring expert mode

Open to any user on the field



- Network for mixed plantations

Any organisation can join

More on

<https://formix.plantedforests.org/>



More on <https://app.silvalert.net>



Loïc COTTEN

Director of development - Alliance Forêts Bois



Innovation & technology solutions in forestry



Réussissons ensemble !

ALLIANCE FORÊTS BOIS : WHO ARE WE?



AFB: from seeds to logs

2023 Figures



HUMAN

42 200 members

who owns 1 million hectare

760 employees

2 000 direct and indirect employment

SILVICULTURE

54 000 hectares of silvicultural works

TURNOVER
217 M€

RESULTS
1 M€

9 370 hectare of plantation
10,6 millions seedlings

HARVESTING AND WOOD COMERCIALIZATION

3,1 millions m³ harvested

87 % PEFC or FSC certified

EQUITY
42 M€

CONSULTING SERVICES

658 sustainable forest management documents

GLOBAL CHANGE: CONCRETE ACTIONS FOR ITS MEMBERS, FOR THE BENEFIT OF THE SECTOR AND OUR FELLOW CITIZENS

INVESTING FOR THE FUTURE

- In our nurseries: improved seeds, diversification of the production, production equipment
- In new forestry tools: limit soil impacts, reduced manpower drudgery
For improved recovery and growth rates

DEVELOPING OUR PRACTICES

- Choice of species for reforestation
- Risks management: fire, storms, pests and diseases
- Management of sensitive areas: identification in the field and in management documents, conservation measures with forest owner's agreement
- Nursery growing itineraries: substratum, fertilization

GLOBAL CHANGE: CONCRETE ACTIONS FOR ITS MEMBERS, FOR THE BENEFIT OF THE SECTOR AND OUR FELLOW CITIZENS

MANAGEMENT AND RECOVERY OF « CRISIS WOOD »

- Support for members on both technical and human levels: diagnosis of the property, insurances, reconstitution
- Mobilising and adding value to wood for regional and national manufacturers

RESEARCH, DEVELOPMENT AND INNOVATION

- BOCAGE FORESTIER: creating hedgerows at the edge of production stands
- ADAPT'AVENIR: new species tested, innovatives silvicultures, mixed forests
- SEMASSIST: AI to optimize filling of culture tray in the nursery
- POUSSPLUS: biostimulants to improve seedlings recovery and growth

GLOBAL CHANGE: CONCRETE ACTIONS FOR ITS MEMBERS, FOR THE BENEFIT OF THE SECTOR AND OUR FELLOW CITIZENS

HUMAN RESOURCES

- Work-linked training (45 students)
- Continuous training of technicians and operators to new practices, tools...

COMMUNICATION

- Inform: getting our messages across stakeholders
- Embodying: highlighting the men and women of the cooperative and the sector
- Dialogue: open and sincere exchange with stakeholders (NGO...)



Roland DE LARY

CEO – CNPF National Center for Private Forest Ownership

National Center for Private Forest Ownership - CNPF (FR)

Field of expertise

CNPF contributes to the sustainable management of French private forests through activities of :

- Validation of sustainable forest management documents,
- Advisory and training role,
- Grouping of private forests,
- **Applied research (IDF)**
 - **Sylviculture and plant material**
 - **Bioeconomy**
 - **Risk and climate change**
 - **Publishing service**
 - **European cooperation**
- Knowledge dissemination.



RMT Aforce

Aims to accelerate knowledge transfer to support foresters in their decision-making

Priority themes 2020-2025

Risk Assessment
(biotic and abiotic)

Guiding forest
management
and adaptation
strategies

Creating the
conditions for the
appropriation of
adaptation solutions
by actors

Areas of work

Support
Experiment
Produce
Tools, methods

Mobilize
multidisciplinary
expertise

Support and train
forest actors

Network activities

Networking, exchanges, information dissemination

Support R&D projects

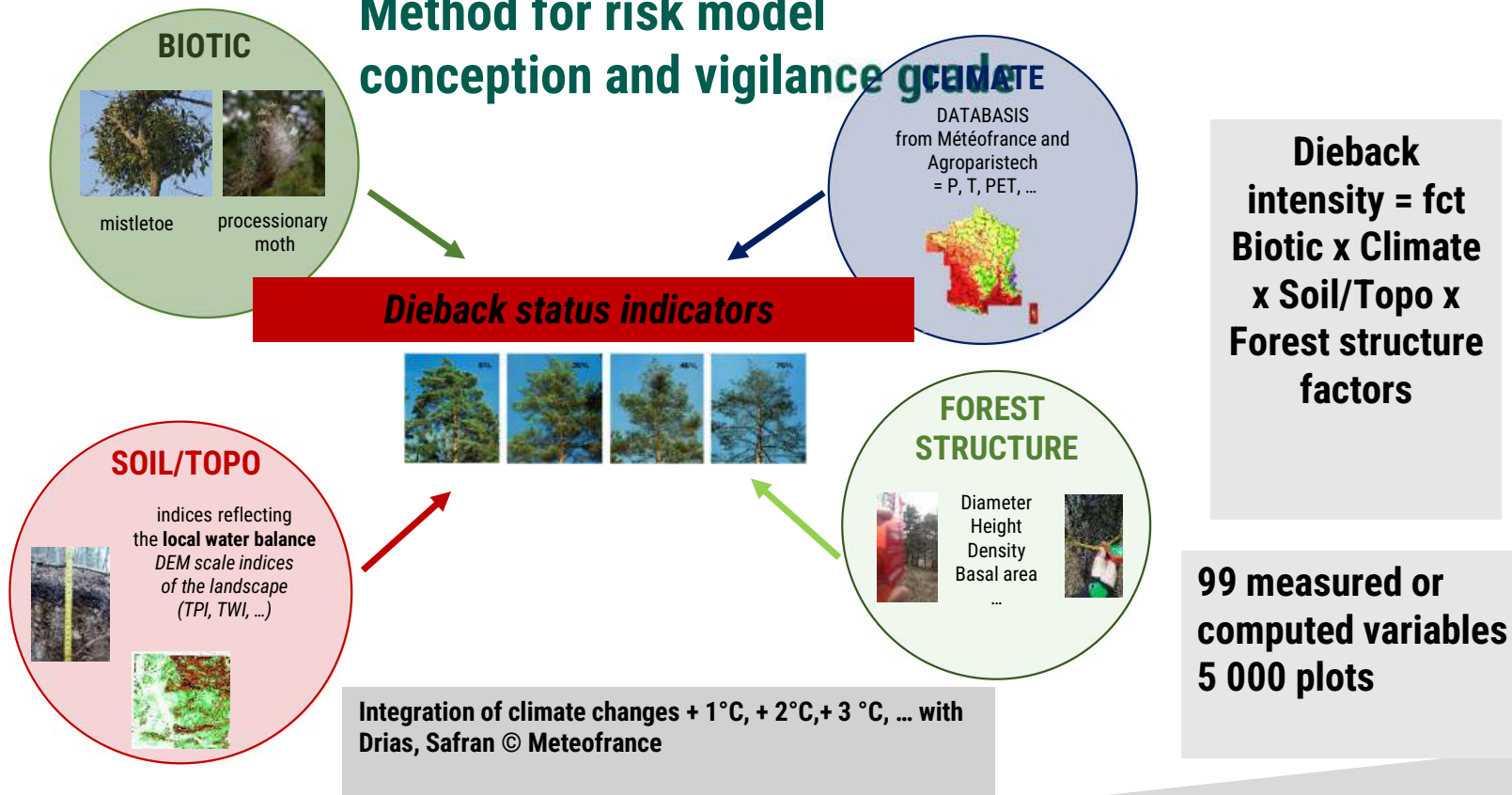
Event organization

Contributions to public policy

Training assistance

Mobile application FORECCAST BY BIOCLIMSOL

Method for risk model conception and vigilance grade



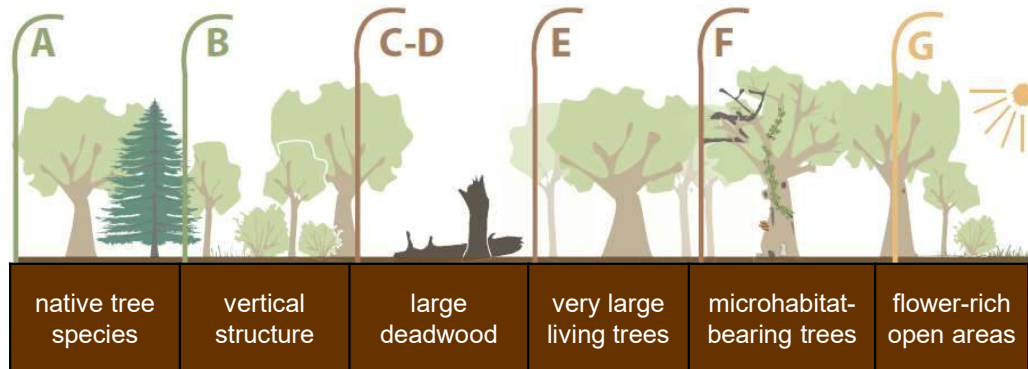
→ a climate change risk assessment tool, now available as a digital application on tablets or smartphones that allows field-scale diagnostics to be carried out directly in the field.



IBP: Index of Biodiversity Potential, a practical tool to help forest managers take into account ordinary taxonomic biodiversity into routine management.

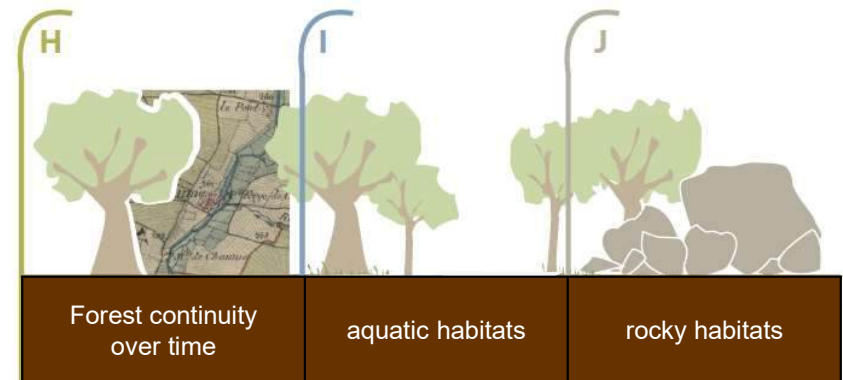
IBP for estimating the potential of forest stands for biodiversity

7 factors directly related to management

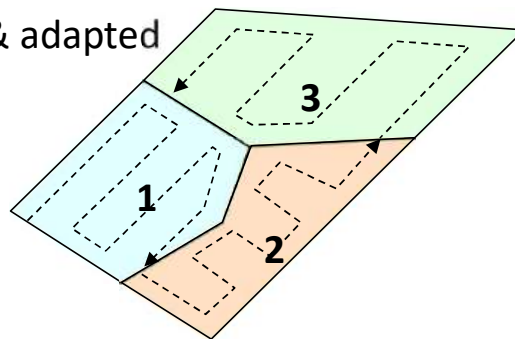


indirect & composite indicator

3 factors rather concerning the context

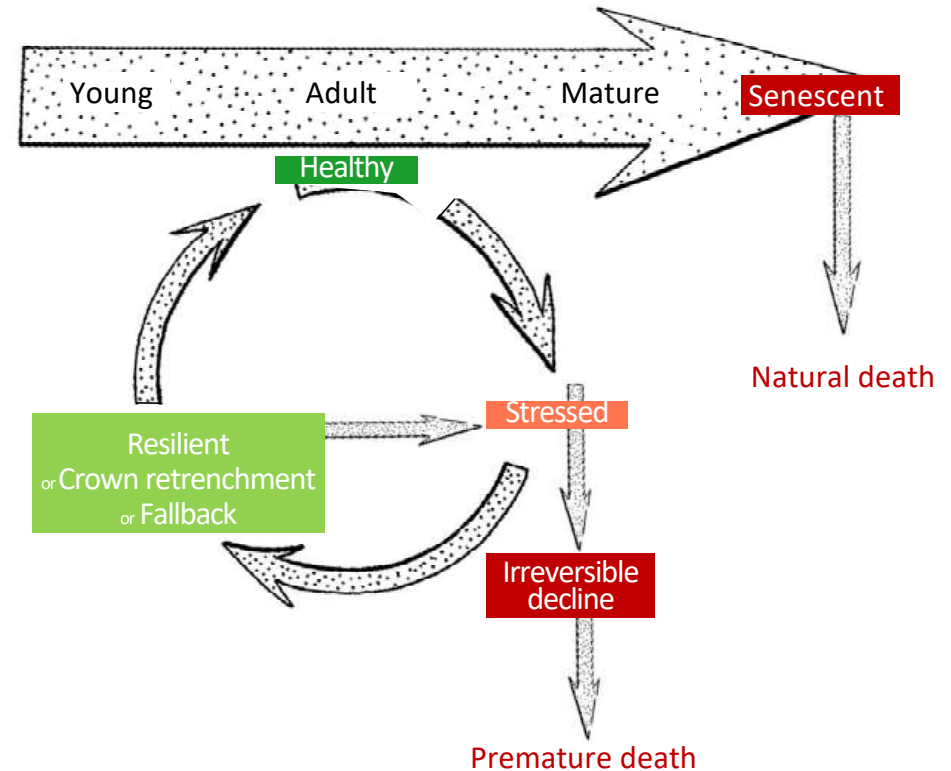


Survey methods: standardized & adapted to different contexts



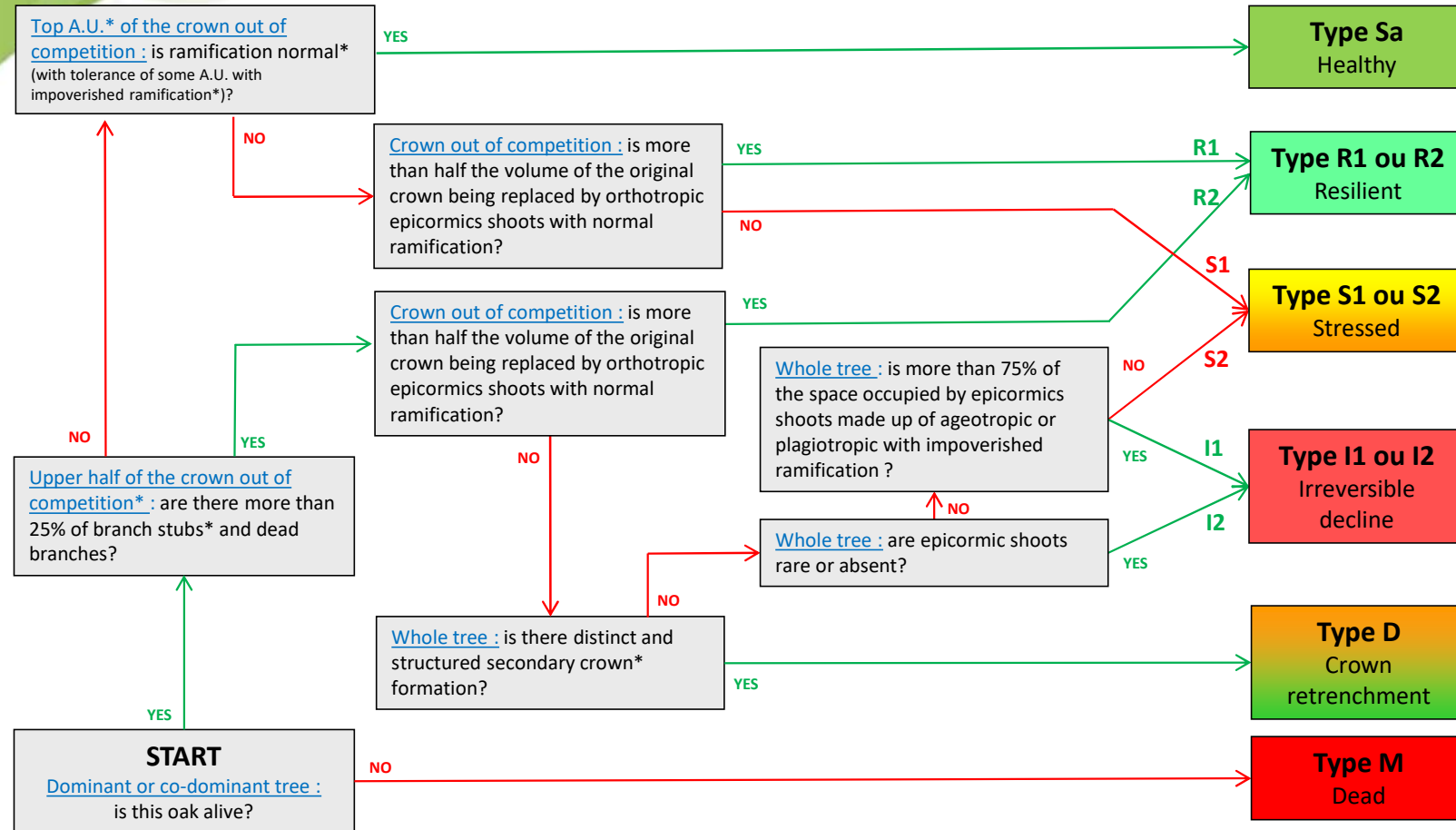
IBP = potential of forest **stands** to support **common taxonomic** biodiversity

Archi: a tool for diagnosing the vitality of trees. The ARCHI method is aimed at foresters, ecologists, arborists, teachers and researchers.



Double diagnosis of the ARCHI method : ontogenic (large horizontal arrow) and physiological (cycle). The diagram illustrates the case of adults, but also applies to young and mature trees.

ARCHI key for adult oaks (*Quercus robur*, *Q. petraea*, *Q. pubescens*)



Crown out of competition: part of the crown excluding the lower or lateral areas, subject to competition for light and space.

Branch stub: a broken off branch with a diameter over 3cm, of which the wound is not yet overgrown with callus.

A.U.: Architectural unit: basic architecture of a tree characterising the young development stage. The first architectural unit builds the stem, the following architectural units originate from each other by duplication and form the crown.

Normal ramification: ramification is qualified as being 'normal' when the transition from a major axis to the short shoots is progressive, following a gradient of intermediary axes with decreasing dimensions.

Impoverished ramification: the ramification of a main axis is impoverished if; i) it directly carries short shoots without producing intermediate branches, which gives it a columnar form; ii) it carries non-ramified twigs, which gives it a filiform structure; iii) it suddenly loses its apical dominance and elongates by forming axes arranged in densely packed, small forks.

Secondary crown : a secondary crown is described as structured when there is strong hierarchy between the epicormic shoots.

Challenges and solutions in New Zealand





Henri BAILLERES

General Manager for Forests to Timber Products - Scion



Paul ADAMS

Innovation Manager - Forest Growers Research Ltd (FGR)

Forest Growers Research

December 5th 2024

FR – NZ Webinar



OUR BIG RESEARCH PROGRAMMES

Our research spans the value chain



Tissue Culture
Partnership

Precision
Silviculture

Automation
& Robotics

Specialty
Species

Resilient
Forests

Tree
Microbiome

Extreme
Wildfire



Our team



**Paul
Adams**

**Chief Executive
Officer**



**Amanda
Brake**

Office Manager



**Alison
Slade**

**Programme Manager
– 21st Century Tissue
Culture
Innovation Manager**



**Claire
Stewart**

**Programme Manager
– Precision Silviculture**



**Keith
Raymond**

**Programme Manager
– Automation &
Robotics**



**Marco
Lausberg**

**Programme Manager
– Specialty Species**

Challenges / Opportunities

- Resilience of our forests
- Climate change – drought, flood, fire, wind
- Biosecurity – pests and pathogens
- Balancing *P. radiata* against other species
- Balancing community, gov't, industry expectations



Key points

- Innovation and technology solutions
- Productive, resilient, forests and lands
- Opportunities to collaborate





Alison SLADE

Innovation Manager - Forest Growers Research Ltd (FGR)

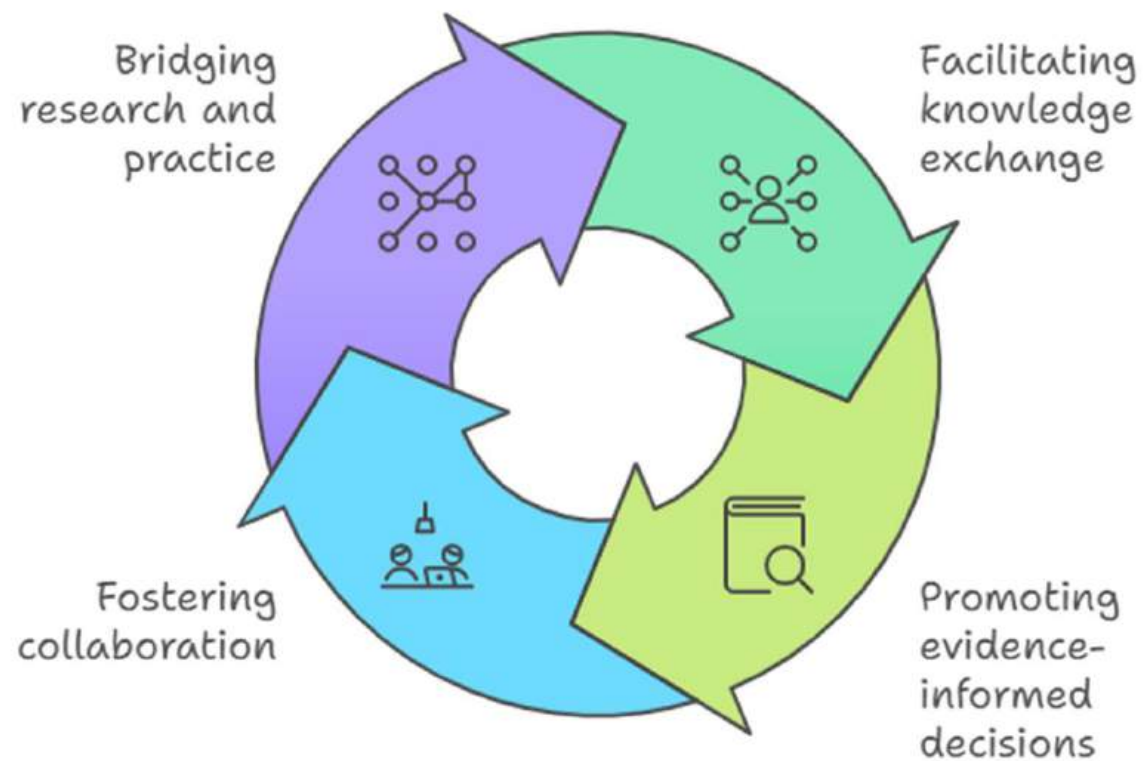
Bridging the gap: enhancing innovation in forestry through knowledge brokering

Alison Slade

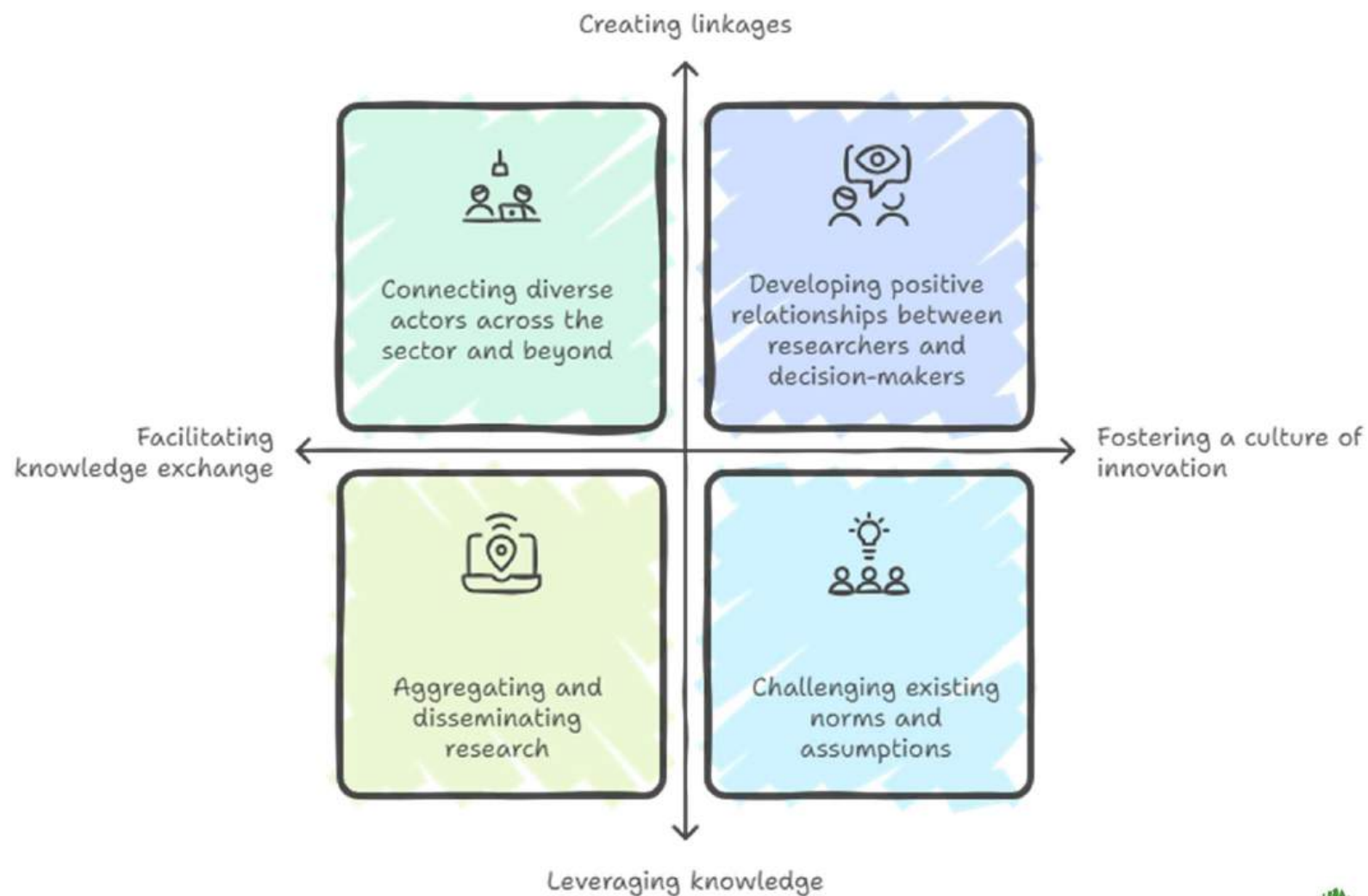
Innovation Manager, Forest Growers Research



What is knowledge brokering?



Enhancing innovation through knowledge brokering



Some FGR- brokered innovations



**Automated embryo
transfer in tissue culture**



**Automated precision
spraying**



Mechanised planting



Virtual reality training



Automated log ID



**New products from
specialty species**

Ian HINTON

General Manager of Strategy & Innovation – Timberlands Ltd



TIMBERLANDS



KAINGAROA
TIMBERLANDS

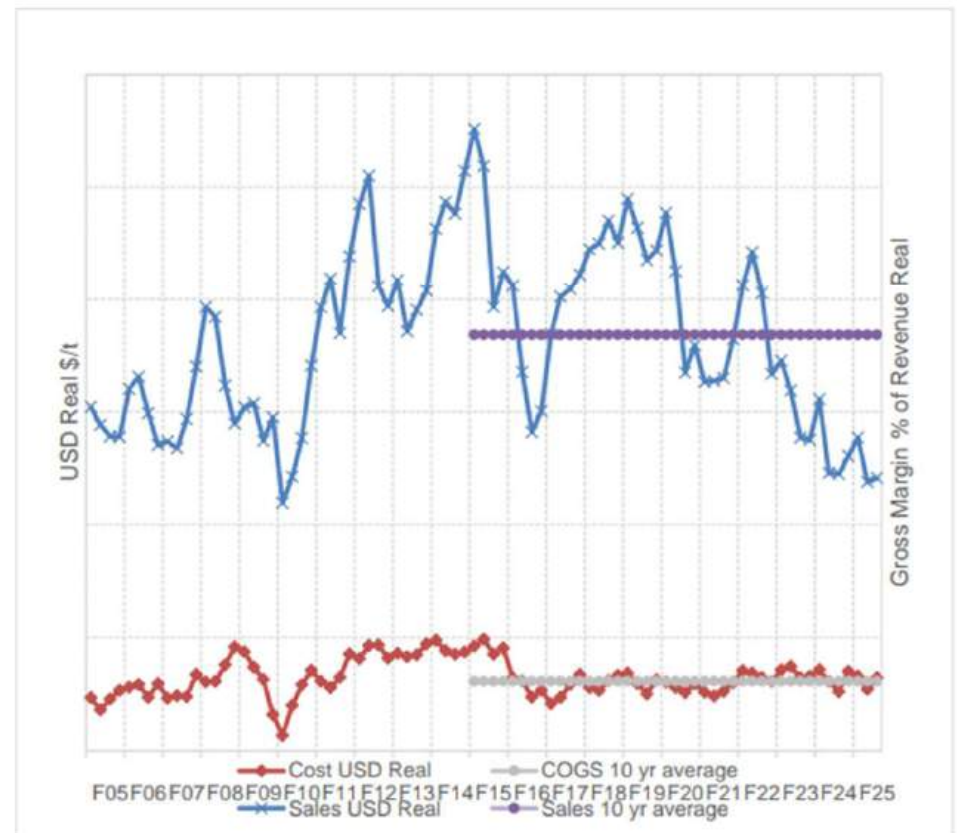
What keeps me awake at night

margins and climate induced risks

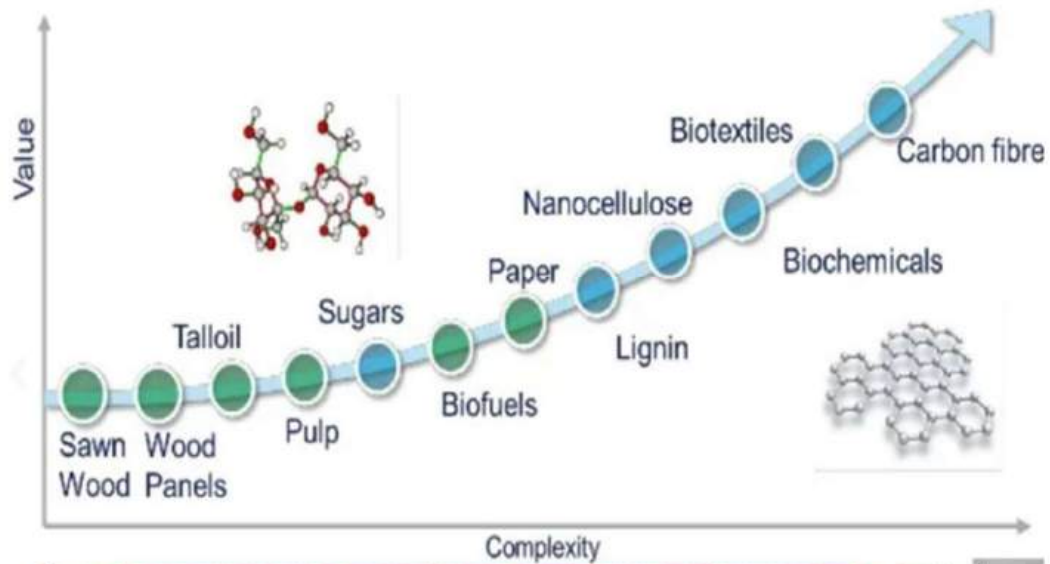
05 December 2024

The Problem(s)

- Recognising there is a problem!
- Margins are poor
- Climate is changing and we are at greater risk of pests and disease and drought
 - One species
 - Takes 20+ years to produce an economically viable product

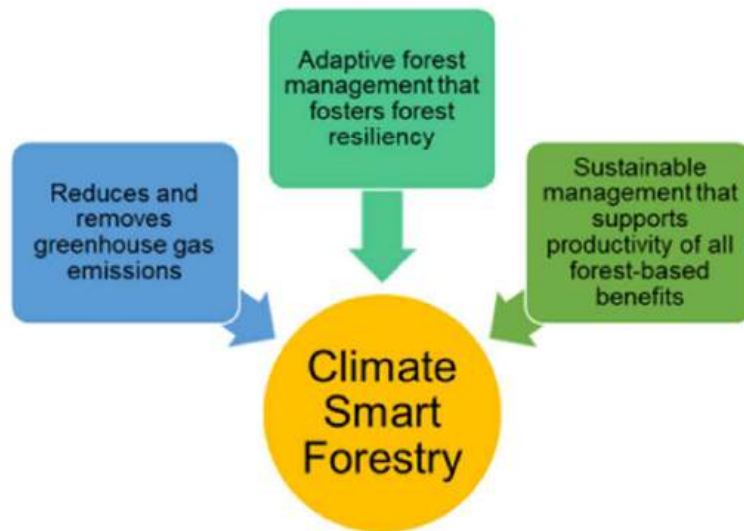


Market Diversification



Biology – and beyond

Climate Resilience



Species and Silviculture



Standard rotation softwoods



Short rotation hardwoods



Short rotation softwoods

Discussions



Conclusion remarks





Jean-Michel Carnus

Voluntary member
Association France Aotearoa Science,
Technology, Innovation (FAST!)



Henri BAILLERES

General Manager for Forests to
Timber Products
Scion