SCION™

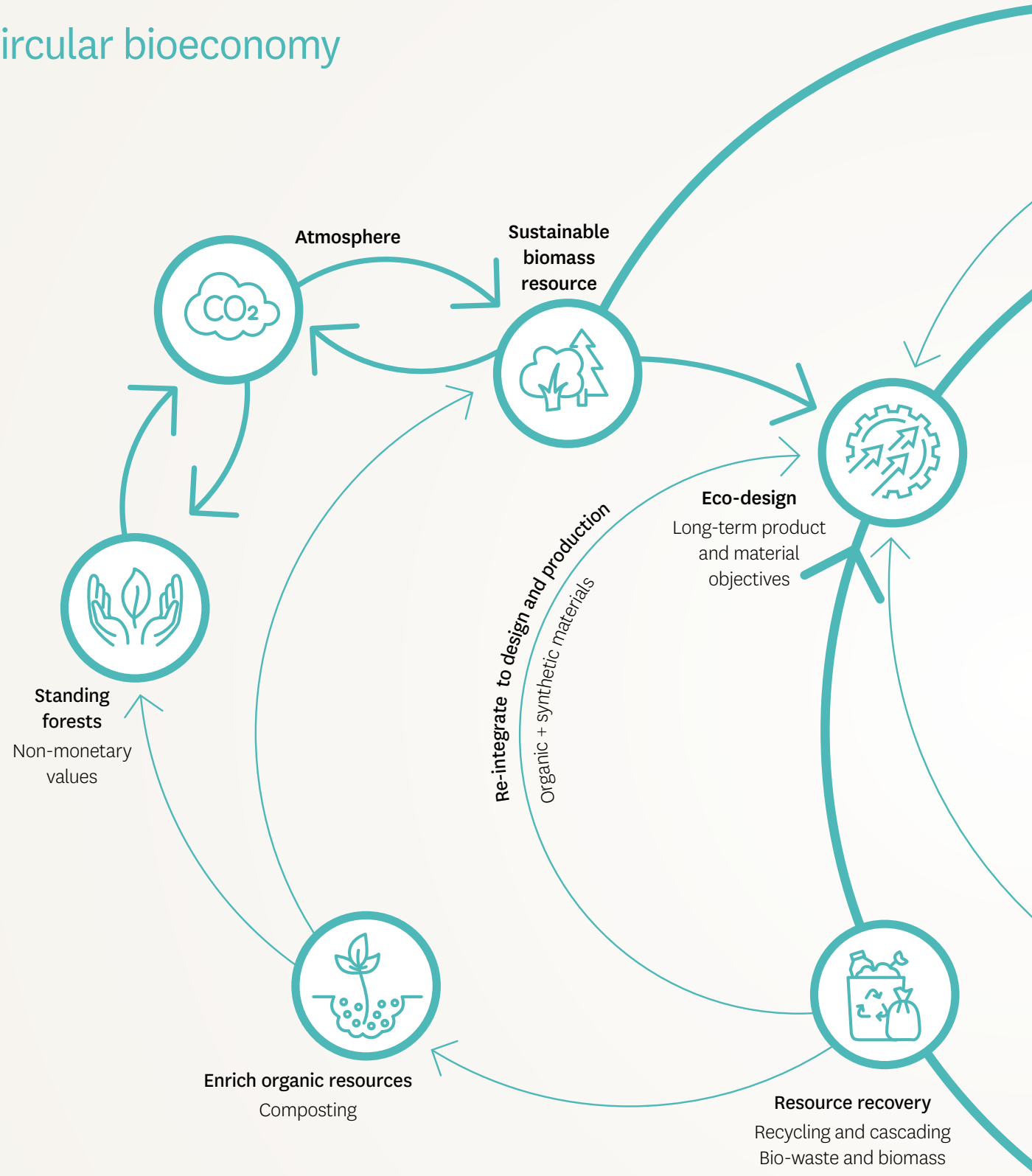
FORESTS ■ PRODUCTS ■ INNOVATION

MAI I TE NGAHERE ORANGA

PROSPERITY FROM TREES

Annual Report 2023

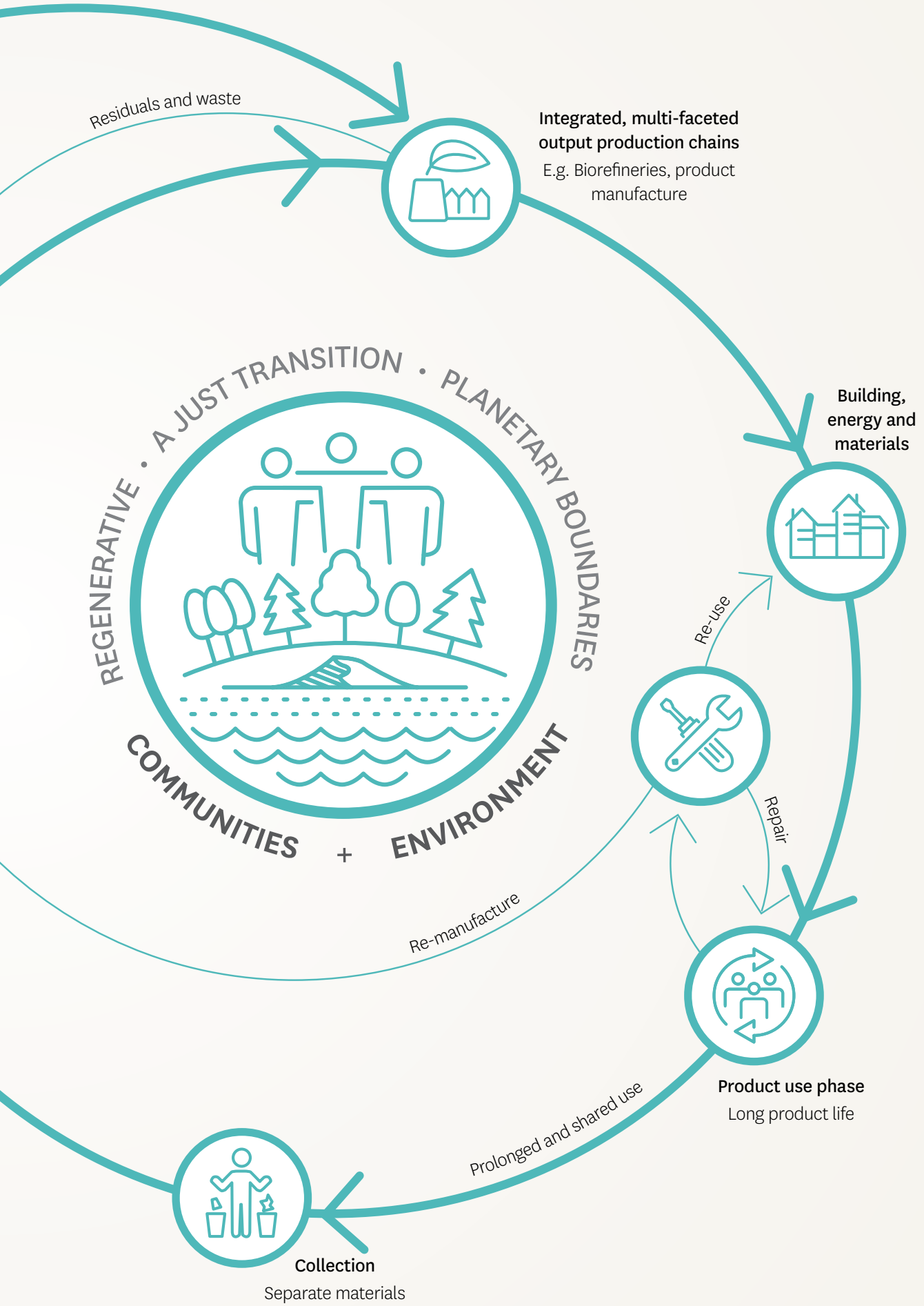
A circular bioeconomy



What is a circular bioeconomy?

A circular bioeconomy is centred around people and nature – getting the most value out of renewable biological resources while minimising waste.

Essential to this concept is ensuring we can unmake everything we make in a clean, non-polluting and regenerative way.


Residuals and waste
Integrated, multi-faceted output production chains
E.g. Biorefineries, product manufacture
REGENERATIVE • A JUST TRANSITION • PLANETARY BOUNDARIES
COMMUNITIES + ENVIRONMENT
Building, energy and materials
Re-use
Repair
Re-manufacture
Product use phase
Long product life
Prolonged and shared use
Collection
Separate materials

SCION
FORESTS ▪ PRODUCTS ▪ INNOVATION

Annual Report 2023

Presented to the House of Representatives pursuant to section 44 of the Public Finance Act 1989.

This annual report meets our reporting responsibilities under the Crown Research Institutes Act 1992 for the year ended 30 June 2023.

The report is available in digital format at www.scionresearch.com/annual-reports

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Tihei Mauri ora

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Koia rā, he oranga tāngata

Ko Te Papa Tipu (Scion) e āki ana i
te oranga o ngā ngahere

Koia, hei rautaki, hei kai ma tātou

Nei rā a Te Papa Tipu (Scion) e mihi kau ana

Ki ngā tini maunga whakahī o te motu

Ki ngā tūmanakotanga o te korowai whenua

Ki ngā manu kai hua o te ngahere

Ki a ngāi tātou e kimi, e rapu, e
hāhau ana i ngā mātauranga

Tēnā koutou, tēnā koutou, tēnā tātou katoa

On behalf of Scion's Board of Directors and Executive Leadership Team, it is a pleasure to present the Annual Report for the 2022-23 financial year.

In 2022 Scion celebrated its 75th anniversary. Today, as we reflect on our achievements and look toward the future, the knowledge and expertise we have developed over all these years remains at the heart of who we are and the impact we seek to achieve.

We finish the year in a good position – slightly below our budgeted revenue but still ahead of the prior year by $5 million. We had budgeted a small loss of $0.7 million with the projected growth but actually delivered a profit of $0.5 million despite the challenges that we have faced recruiting staff as a result of immigration settings.

Our purpose

Scion exists to drive innovation and growth from New Zealand's forestry, wood product and wood-derived materials and other biomaterial sectors, to create economic value and contribute to beneficial environmental and social outcomes for the country. That purpose is our north star, and we are recognised as world-leading in providing research and technology to enable it.

Scion has long-advocated for a shift from fossil fuels towards a more sustainable, circular bioeconomy using renewable resources from our forests, land and sea, plus the waste we send to landfill, as inputs to produce low-carbon, high-value products and materials.

Forests are fundamental to our vision for the circular bioeconomy not only for their ability to sequester carbon and meet climate change targets, but also as a renewable source o fbiomass to create low-carbon alternatives for things like fossil fuels, plastics, and the concrete and steel in our buildings.

We are not alone in this view. The UN Strategic Plan for Forests has a target to increase forest area by 3% worldwide by 2030, and the World Wildlife Fund has predicted a potential 300% increase in demand for wood-based materials and energy between 2010 and 2050 in their Living Forests Report. Information from the World Bioeconomy Forum indicates that nearly 60 countries have national bioeconomy strategies, with bioeconomies contributing as much as US $30 trillion to the global economy each year. And a report prepared by KPMG for the New Zealand Product Accelerator indicates that the bioproducts-from-forestry opportunity could, based on current export log volumes, add $12 to $19 billion per annum in export value, and $2.5 to $6.2 billion in import substitution. These estimates are based on current forest production and will only grow as our science and innovation helps double the growth rate of New Zealand's expanding forest estate.

Our strategy: Right tree, right place, right purpose

Against this backdrop, our Strategy to 2030 outlines the aspirations we hold for New Zealand and how Scion, through research and science in the field of forestry, bio-manufacturing and the circular bioeconomy, will achieve those aspirations and deliver on our purpose. Products derived from forests can displace those derived from fossil fuels and use every inch of the tree, including the waste, to enable the circular bioeconomy. We see Māori and Te Ao Māori as critical in delivering on this opportunity.

> Scion exists to drive innovation and growth from New Zealand's forestry, wood product and wood-derived materials and other biomaterial sectors.

Indigenous and exotic forests, planted either for harvest or for their standing value, provide a wealth of economic, environmental, social and cultural services. They are an essential part of our country's climate change response, and to protect and grow the taonga of New Zealand's unique biodiversity.

Achievements from the year

Our teams have delivered significant impact over this past year, providing science and solutions that advance our progress toward a carbon zero future as demonstrated throughout this report.

We pivoted some of our work following Cyclones Hale and Gabrielle, including accelerating work on distributed manufacturing that will create value from slash and woody debris that would otherwise be left on the forest floor. We also shifted focus in our world-leading research in remote sensing and machine learning to better understand the damage caused and help the sector plan for future events.

We have also made some significant progress in delivering on our commitments to Māori. It was an honour to commence the year with the August 2022 signing of a Kawenata between Scion and tangata whenua Ngāti Hurungaterangi, Ngāti Taeotu and Ngāti Te Kahu. Through this Kawenata and our ongoing relationships we are confirming our commitment to the value of working together in the spirit of cooperation and the Te Tiriti principles of partnership, participation, protection and equity.

> Indigenous and exotic forests are an essential part of our country's climate change response, and to protect and grow the taonga of New Zealand's unique biodiversity.

Partnerships are at the heart of our plans to transform our Rotorua campus, Te Papa Tipu Innovation Park, into a modern, high-tech research facility. With 40 different companies already co-locating in the Innovation Park, our aim is to better enable collaboration and innovation, while also continuing to serve as a destination for our community where they can interact with all who share our space. We see a critical need for New Zealand to have scale-up infrastructure in the proposed Bio Innovation Pilot Centre located here on our campus to enable the commercialisation of our science and expertise. We are also working closely with the University of Canterbury on co-location options for our Christchurch facilities.

This year partners like AgriSea, with their construction of a seaweed based nanocellulose plant, Ecogas, opening New Zealand's first commercial scale anaerobic digestion bioenergy plant, and Cetogenix, attracting $4.5 million in seed capital investment, have proved what is possible through collaboration and partnership.

Our international partnerships are equally as important and this year we signed an agreement with one of France's key research organisations, the French National Research Institute for Agriculture, Food and the Environment (INRAE), a partner we have had the pleasure of collaborating with for more than 20 years. Our intention with the new agreement is to create an Associated International Laboratory that will contribute to further bioproducts research.

The challenges we face

Despite the significant achievements of the year, Scion continues to find barriers to success. We are highly constrained by a system that does not align funding to purpose.

The publication of Te Ara Paerangi – Future Pathways shows that we need a future-fit science and innovation system if Scion and others are to deliver on Government expectations and serve Aotearoa to the best of our ability. We are committed to ongoing involvement as policies are shaped. Change is overdue. In the meantime we continue to work on the government and commercial partnerships needed to secure resources aligned with our Strategy to 2030.

Our people are as critical as funding, and it is vital that policies and systems enable us to both grow our own domestic pool of talent and draw from the international market for the expertise we require while supporting our people and their families through these uncertain times.

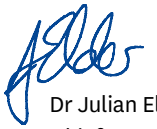
We see a critical need for New Zealand for scale-up infrastructure in the proposed Bio Innovation Pilot Centre located on our campus to de-risk and help scale up production of the innovations needed to transition to a circular bioeconomy. New Zealand is putting at risk a potential $30 billion opportunity without this.

Thanks

We would like to thank our people for their extraordinary efforts over the year and their ongoing commitment to our business and our Strategy to 2030. We farewell future director, Melinda Webber, and thank her for her contribution and insights that enriched our approach. We also farewell our General Manager Te Ao Māori and Science Service Hēmi Rolleston and thank him for the significant progress he has achieved in the establishment of our Te Ao Māori strategy.

It has been a momentous year for everyone in the sector and we look forward to working with partners and government to see if we can unleash more of Scion's potential to deliver benefit for New Zealand.

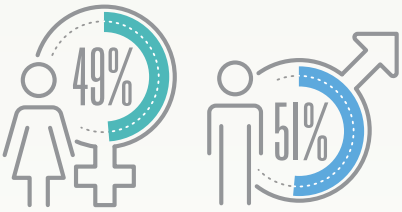
Dr Helen Anderson QSO
Chair



Dr Julian Elder
Chief Executive

Year at a glance

348 permanent employees across three offices



51% male and 49% female

Zero serious harm events

75 years: In 2022 we celebrated our 75th anniversary

$64m total revenue

$544k profit after tax

$13m of commercial research revenue

Industry

The value of all forestry exports currently is over $6 billion a year, equivalent to 1.6% of New Zealand's gross domestic product (year ending June 2022)

A circular bioeconomy is a $30 billion economic opportunity

New Zealand has 10.1 million hectares of forests covering 38% of the land.

Eight million hectares of indigenous forest, around 1.8 million hectares of productive forestry and the remainder managed for other uses

More than 35,000 people are employed in the forestry industry including wood production, wood processing and supply.

About us

Scion is one of seven Crown Research Institutes (CRI) that carry out scientific research for the benefit of Aotearoa New Zealand. Since its origins as the Forest Research Institute in 1947, Scion has promoted forests and forestry for multiple benefits.

Looking ahead, we know that forests will be at the heart of a low-carbon, biological-based future New Zealand. We know too that forests will offset greenhouse gas emissions on a scale unmatched by any current technologies. And we know that renewable materials derived from trees will replace those from fossil fuels.

Our research supports the growth and effectiveness of the forestry, wood product and wood-derived materials and other biomaterial sectors, and the development of new technologies that use trees and renewable materials to create environmentally friendly products.

The future as we see it

The right trees in the right places and for the right purposes, will enhance our nation's social, environmental and economic well being.

Scion has ambitious aspirations for Aotearoa New Zealand, aspirations we believe are achievable through the potential of forests to transform how we live; from permanent forests stabilising land and capturing carbon, and forests for the manufacture of high-value products, through to short-rotation energy forests.

The future as we see it is one where regions are thriving through their expanded and enriched planted forests. Trees will make up more of the rural and urban landscapes as major contributors to mitigating climate change and protecting and enhancing our environment.

High-value construction and appearance timber products will meet domestic and international demand. Timber will be the norm in multi-level construction and our cities will be increasingly sustainable in character and design.

New materials and energy derived from trees will have displaced oil-derived products. New biobased industries that use wood waste-derived materials will have replaced those that relied on imported chemicals and fuels.

Our 2050 aspirations for New Zealand:

- 10-fold increase in GDP from forests and manufacturing
- Zero carbon emissions
- All erodible land planted in permanent forests
- Zero water quality issues from land use
- Sustainable communities and economies in all regions
- High OECD household net wealth ranking
- Much improved living standards

Our Strategy to 2030: Right tree, right place, right purpose

Scion's Strategy to 2030 aims to help Aotearoa New Zealand transition to a circular bioeconomy, growing the right tree in the right place for the right purpose.

Through the impact of our research, science and innovation, and in partnership with others, we are supporting this nation and its forestry sector to create a more sustainable way of living in a low-carbon, circular, biobased economy.

Our core purpose

To drive innovation and growth from New Zealand's forestry, wood product and wood-derived materials and other biomaterial sectors, to create economic value and contribute to beneficial environmental and social outcomes for New Zealand.

Our vision

Prosperity from trees.
Mai i te ngahere oranga .

Our mission

Enhancing New Zealand's prosperity, wellbeing and environment through trees.

Kia piki te ora, te taiao me te whai rawa o Aotearoa mā te ngāherehere.

Three impact areas:

Forests to biobased products

Developing products, processes, manufacturing, trees, other biomaterials and healthy, resilient forests to replace petrochemicals and non-sustainable materials.

Forests to timber products

Developing products, manufacturing, high-value trees and healthy, resilient forests that capture an increasing share of the global, high-end market for timber.

Forests and landscapes

Growing healthy, resilient forests that are planted primarily for their standing forest benefits.

11 research portfolios

Each with its own research roadmap, informed and co-designed with key stakeholders.

Ngā Hapū e Toru:
Ngāti Hurungaterangi, Ngāti Taeotu me Ngāti Te Kahu

We continue to build our relationship with the tangata whenua of our Rotorua campus – Ngāti Hurungaterangi, Ngāti Taeotu, Ngāti Te Kahu (Ngā Hapū e Toru – the three hapū).

Our growing partnership with Ngā Hapū e Toru was formalised in August 2022 through the signing of a Kawenata – Memorandum of Understanding, establishing our shared commitment to five matapono – principles: whakapapa, kotahitanga, rangatiratanga, manaakitanga and tiakina te mana o te whenua.

The Kawenata is in both English and te reo Māori. It formalises the enduring partnership and provides a framework for the relationship. It guides activity to build and strengthen engagement and outlines how progress will be reported.

Since the signing, Ngā Hapū e Toru have outlined their key focus areas of whenua, tikanga and values, and relationship and representation. Across these areas the hapū have defined their aspirations for the future and the role they will play in working with Scion's Board, supporting its Te Ao Māori team and seeking alignment between the values of Scion and the Kawenata.

This past year we welcomed a Future Director to the Scion Board, to represent Ngā Hapū e Toru. A Future Director does not hold voting rights but provides insights and unique experience to the Board.

In FY23 we were joined by Dr Melinda Webber (Ngāti Whakaue, Ngāpuhi, Ngāti Kahu) as our first Future Director. Dr Webber is Te Tumu, Deputy Dean and Professor of Māori Education in the Faculty of Education and Social Work at the University of Auckland.

As the new financial year commenced, we farewelled Dr Webber and welcomed Zara Morrison (Ngāti Taeotu, Ngāti Whakaue, Ngāti Tūwharetoa) to the Future Director role. A chartered accountant for 12 years, Ms Morrison is currently a Project Manager at Te Kura Kaupapa Māori o Te Koutu in Rotorua."

Scion board chair Dr Helen Anderson (left) and Veronica Butterworth (right), representing the three hapū - Ngāti Hurungaterangi, Ngāti Taeotu and Ngāti Te Kahu with the Kawenata that was signed in a formal ceremony surrounded by the hapū, Scion Board, staff and guests.

A permanent visitor display in the atrium of Te Whare Nui o Tuteata shares the history and connection that Ngā Hapū e Toru have to the whenua, while also explaining the significance of forestry science and innovation to New Zealand and the world.

A Hunga Whakahaere Matua – Hapū Operations Manager role was established in 2021 to focus on strengthening the partnership between Ngā Hapū e Toru and Scion looking for mutually beneficial opportunities.

Tamara Mutu (Ngāti Hurungaterangi, Ngāti Te Kahu) is the Hunga Whakahaere Matua.

"The role is about giving voice to Ngā Hapū e Toru and creating visibility of our presence," she says.

"The role is about enabling the hapū to be engaged at every level, so our aspirations can be realised. It takes time to build something that will endure and we are still in the early stages of this process, but we welcome the commitment shown by Scion."

The signing of the Kawenata was an auspicious event that brought our people together within Te Whare Nui o Tuteata – the Great House of Tuteata.

In October 2020, Ngā Hapū e Toru gifted the name of their ancestor, Tuteata, to Scion for its headquarters in Rotorua to signify the importance of the partnership being built.

The signing was followed by the launch of a new permanent visitor display in the building's atrium. Co-funded by Scion and Te Uru Rākau – the New Zealand Forest Service, the displays are a creative bilingual storytelling experience that explore the history of tangata whenua, forestry and the future.

The displays share the Kawenata and connection that Ngā Hapū e Toru have to the whenua, while also explaining the significance of forestry science and innovation to Aotearoa New Zealand and the world.

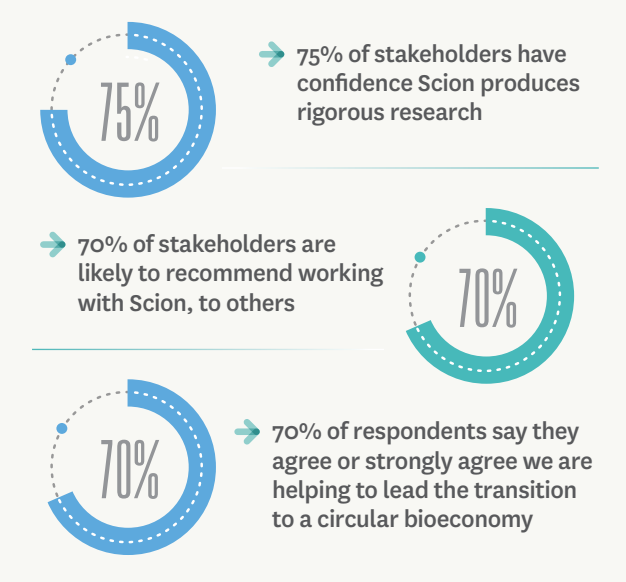
scionresearch.com/kawenata-te-reo
scionresearch.com/kawenata-english

Working collaboratively within many communities

Integral to our work is collaboration and partnership with others.
We operate within many different communities to deliver on our core purpose.

In 2023 we surveyed our stakeholders to gain greater understanding of their views of our strategy, research, communication and the way we work. The results provide a baseline of information that will help guide our approach to engagement and communication.

Results indicated that while stakeholders broadly agree with our strategy and approach, there is more we could be doing to help people understand and connect with our purpose, objectives and priorities; with 50% of respondents saying they are aware of and can readily access our research, and 50% agreeing that we communicate in a way everyone can understand.



Science New Zealand

As one of seven Crown Research Institutes (CRI), Scion is a proud member of the Science New Zealand collective. Our community includes 4,400 smart and passionate people, running 6,000 science projects each year, across 54 sites.

Many of Scion's research programmes are delivered in partnership with fellow CRIs. For example: The Bioprocessing Alliance is a collaboration with Plant and Food Research, AgResearch, Callaghan Innovation and a number of universities. It works to advance innovation in the manufacturing of biological residues into new products.

Better Border Biosecurity (B3) is a collaboration between the Ministry for Primary Industries (MPI), the Department of Conservation (DoC), Plant and Food Research, AgResearch, Scion and primary sector industry bodies using science to improve New Zealand's biosecurity system.

Māori

Scion recognises Māori as a critical partner in research, science and innovation, both as kaitiaki of significant natural resources and mātauranga, but also as owners and managers of commercial assets.

Since 1997 more than 70 state-owned forests have been returned to iwi in Crown Treaty settlements, a figure that will grow as settlements conclude and more Māori-owned businesses in the value chain emerge.

Steps Scion has taken in recent years were initiated with Te Tiriti in mind. These include establishing a Te Ao Māori Research Group in 2021.

We welcome and embrace mātauranga Māori, and this is reflected in some of the proposed and current research programmes in Scion's Impact Areas.
See more on pages 13–17.

Central and local government

As significant funders and partners in our research, we work closely with both central and local government including our shareholding Ministers, the Minister of Research, Science and Innovation, and the Minister of Finance.

We work particularly closely with the Ministry for Business, Innovation and Employment (MBIE), MPI, (particularly Te Uru Rākau – the New Zealand Forest Service) and the Ministry for the Environment (MfE), on the delivery of our Strategy to 2030.

We provide input at every level of government as departments and councils develop policies that can be supported by Scion's capability and expertise, and adopt new methods and approaches informed by our work.

Government and industry collaboration is evident in work such as Timber Unlimited (formerly the Timber Design Centre), a key initiative in helping deliver the intent of the Forestry and Wood Processing Industry Transformation Plan. The centre is an initiative between Te Uru Rākau and a consortium comprising Scion, the Wood Processors and Manufacturers Association (WPMA), New Zealand Timber Design Society and the Building Research Association of New Zealand (BRANZ).

Domestic and international research partners

Scion works alongside a wide and varied network of private and public research institutes and universities. We hold long-standing partnerships with universities, such as the University of Canterbury and the University of Waikato, where research teams collaborate over many years.

Scion's networks extend around the globe giving us access to advanced scientific tools and helping keep us at the forefront of innovation. We often work in multi-party global collaborations and our people represent New Zealand in international associations and consortia.

International collaborations include the French National Research Institute for Agriculture, Food and the Environment (INRAE), VITO Research in Belgium, VTT Research Finland, Fraunhofer IGB in Germany, the International Union of Forest Research Organizations (IUFRO) and US Forest Service to name just a few.

Rotorua and Bay of Plenty communities

We are proud to share our main campus in Rotorua with tenants from 40 different companies and with the wider community as a whole.

Te Whare Nui o Tuteata, our front-door to the community, is open daily with all invited to enjoy the interactive exhibition area and public café. We are proud to play host to community events on the oval such as February's Ngāti Whakaue Whānau Day.

As one of the largest employers in Rotorua, many people rely on Scion staff directly and indirectly for their livelihood. We provide a wide variety of jobs ranging from highly skilled science roles to various corporate, technical, nursery and field support roles.

We take great pride in the role we play in supporting Rotorua city and the region in becoming a hub for technology, innovation and the circular bioeconomy, as well as supporting our traditional forest industry partners located in the region.

Forestry industry

Scion works with those who grow trees and those who manufacture products from trees to support them in achieving their business objectives which include: increasing onshore processing of trees, minimising risk to trees from biotic and abiotic sources (pests, diseases, fire and wind), forest diversification, reducing cost along the supply chain and maintaining the industry's social licence to operate.

The industry invests heavily in our research, working in close partnership with us to deliver outcomes for the benefit of the sector. Once such programme is the Specialty Wood Products Partnership (SWP), which includes industry, government and researchers, aimed at developing a high-value wood products industry based on alternatives to radiata pine like Douglas-fir, eucalypts and cypresses.

Manufacturing and bioproducts industries

We work alongside many companies striving to introduce more sustainable and circular practices and products into their own operations and the marketplace. We work alongside manufacturers and product developers to improve processing systems and devise novel ways of using renewable resources in areas such as plastics, composites, packaging and biodegradation.

One example is our work with partner Zespri to enhance the sustainability of their packaging. Scion and Zespri this year extended their existing secondment of two Scion packaging scientists to Zespri by an additional six months. The secondment has provided valuable packaging services and food contact standards for Zespri as well as the initiation of collaborative projects targeting the development of innovative packaging solutions.

Commercial partners

Scion is proud to work alongside commercial partners to deliver research that can be applied in real-world situations and to commercialise technology that drives innovation and growth.

Many of these partners such as Cetogenix and AgriSea are part of the burgeoning climate tech and biomaterials industries. Read more on page 20.

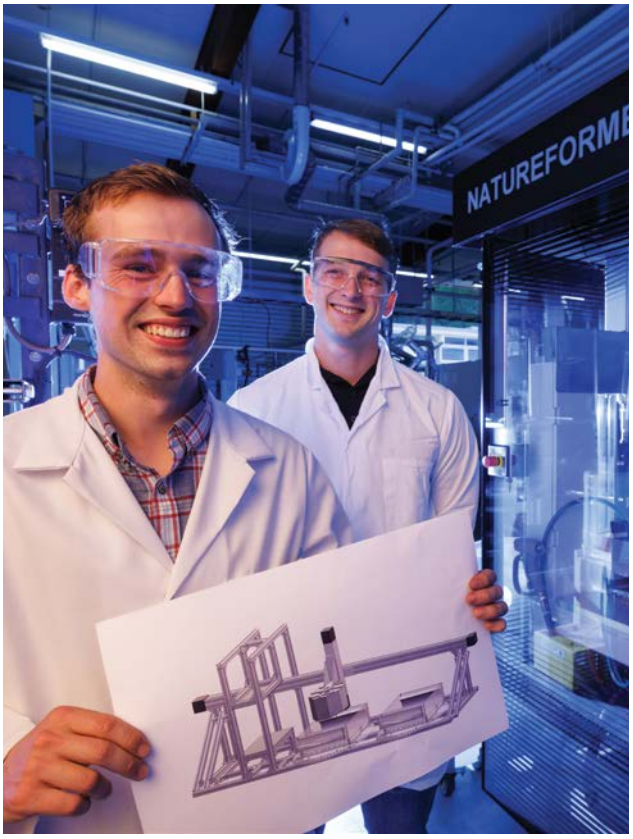
For example, Humble Bee Bio, a New Zealand-based biotechnology company is collaborating with Scion on fermentation and material development. They have discovered a biopolymer derived from a bee species that exhibits properties highly sought after for a range of high-value applications.

Next generation scientists

We know that our future rests on the shoulders of the next generation of science, technology, engineering and maths (STEM) students, and that New Zealand needs more students to embrace STEM subjects.

This year we hosted 28 university summer intern students, in Rotorua and Christchurch. Then, in the April school holidays, 25 intermediate and high school students learnt about the world of 3D printing and Morph, a new flexible 4D printing filament developed at Scion and now commercially available through Imagin Plastics.

We loved being part of the August Bay of Plenty Science Fair, and the October Tauranga STEM festival. Another highlight was when we hosted intermediate school student Alex Malcolm as part of the 'Day with a Scientist' initiative associated with the July Te Tūkohu Ngāwhā Science and Design Fair.



What better way to spend summer than working in Rotorua with Whakarewarewa Forest right on your doorstep? Twenty-eight university students from around New Zealand took the opportunity to combine their love for science and the city by completing summer internships at Scion.

(L): Caelum Betteridge was mentored by Karl Molving during development of a benchtop thermoformer design.

(R): Janet Reid using a vacuum filtration setup to apply a layer of nanocellulose to a paper scaffold.

Sharing our work – learning from others

Science papers and quality

(Calendar year Jan-Dec 2022)

142
peer-reviewed journal articles
(down from 201)

111.38
H-index factor (5-year rolling average)
(up from 107.09)

5.26
Journal impact factor
(up from 4.56)

Tech transfer

227
commissioned reports to users
(down from 288)

190
presentations on technical information and research results
(up from 176)

247
publications on technical information and research results
(up from 141)

138
peer-reviewed articles
(down from 208)

Collaborations

130
publication collaborations with international research institutions
(comprises peer-reviewed articles, technical publications and contract reports)
(down from 146)

22
partnerships with Māori
(up from 16)

89
publication collaborations with other New Zealand institutions
(comprises peer-reviewed articles, technical publications and contract reports)
(down from 91)

Communication

499
media mentions
(up 138%)

2,185
subscribers to Scion Connections magazine
(up 40%)

17,062
followers on social media channels
(up 27%)

17,986
views of You Tube videos
(up 21%)

64,374
website page views
(up 52%)

Products from trees

Trees are a sustainable and renewable source of materials that can provide thousands of everyday products.

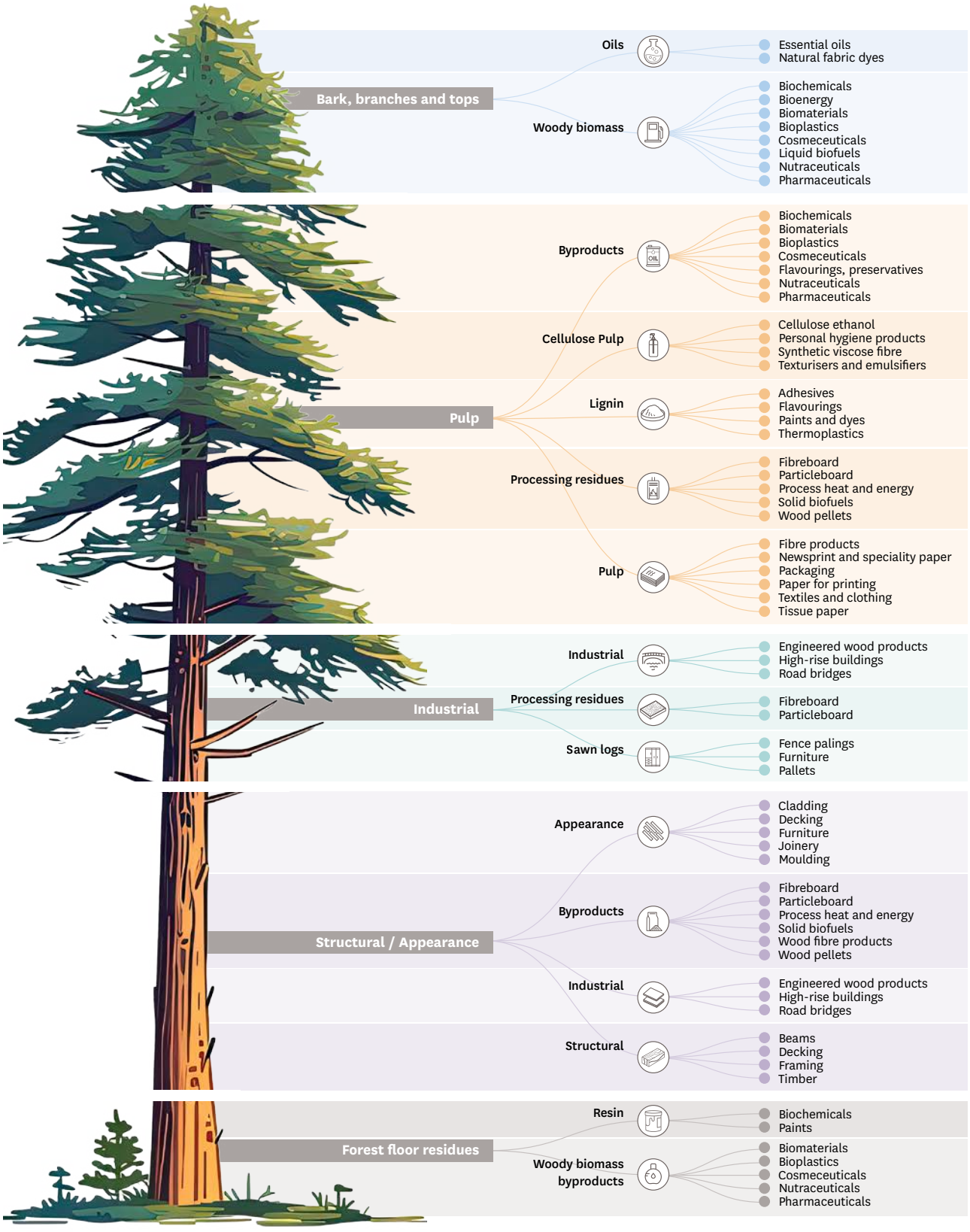


Figure 1: *Products derived from different parts of a tree.*

Collaboration with Māori

Scion recognises Māori as a critical partner in research, science and innovation, both as inter-generational kaitiaki of significant natural resources and mātauranga, and as owners and managers of commercial assets.

Our Strategy to 2030 sets out a path to build science and research partnerships with Māori, with a focus on enhancing Māori use of land and forestry resources to realise the economic, social, environmental and cultural opportunities of the circular bioeconomy.

In 2021, Scion established a Te Ao Māori Research Group to lead our approach; actively seek out pathways for Māori partnership, co-development and co-design; support and enable Māori-led research; nurture our valued relationship with the tangata whenua for our Rotorua campus and build Scion's cultural capability.

Two of Scion's 11 portfolios have strong Te Ao Māori pathways. They are 1) Restoration, protection and mauri o Te Waonui a Tāne and 2) Distinct value of indigenous wood products.

Indigenous thought and fibres the way forward

In May 2023, Scion hosted the inaugural Indigenous Plant Fibres Symposium, bringing together growers, processors and product developers, to support new and innovative Māori-led opportunities.

The symposium, *Supporting an Indigenous Plant Fibres Value Chain in Aotearoa*, was a chance to showcase work already underway and grow the community of people focussed on the role of indigenous and natural fibres in unlocking environmental, social and economic opportunities.

Whenua Oho chief executive and Ngā Pou o Tāne chair Te Kapunga Dewes opened the symposium and said Māori were naturally aligned with the concept of a circular bioeconomy because kaitiakitanga, guardianship, was an underlying concept.

"Balance, harmony with the environment, our people, and our community. All of these are important and a natural cultural fit for us."

He said because Māori aligned with a circular bioeconomy, they needed to be part of conversations to ensure their input was heard and executed.

Scion's Bioproducts and Packaging Portfolio leader Dr Alec Foster said the symposium aimed to create a space for people to develop connections organically.

"By seeding relationships, we hope to seed innovation."

Scion wants to continue working together with Māori to grow the conference into an annual Te Ao Māori-led event.

Read more: scionresearch.com/ar23-indigenous-fibres

Ngā Pou a Tāne, the National Māori Forestry Association hosted "Ngā Kōrero Rangatira mō Ngā Hua Ngahere 2023" at Scion on 11-12 May 2023. The national summit brought together Māori forestry leaders from across the motu, to wānanga with partners on the priority areas of the Forestry & Wood Processing Industry Transformation Plan, and the implementation of a national Māori forestry strategy.

Te Rātā Whakamaru – The sheltering rātā

The Myrtle Rust Jobs for Resistance programme, Te Rātā Whakamaru, provides a blueprint for using community partnerships to deliver local results.

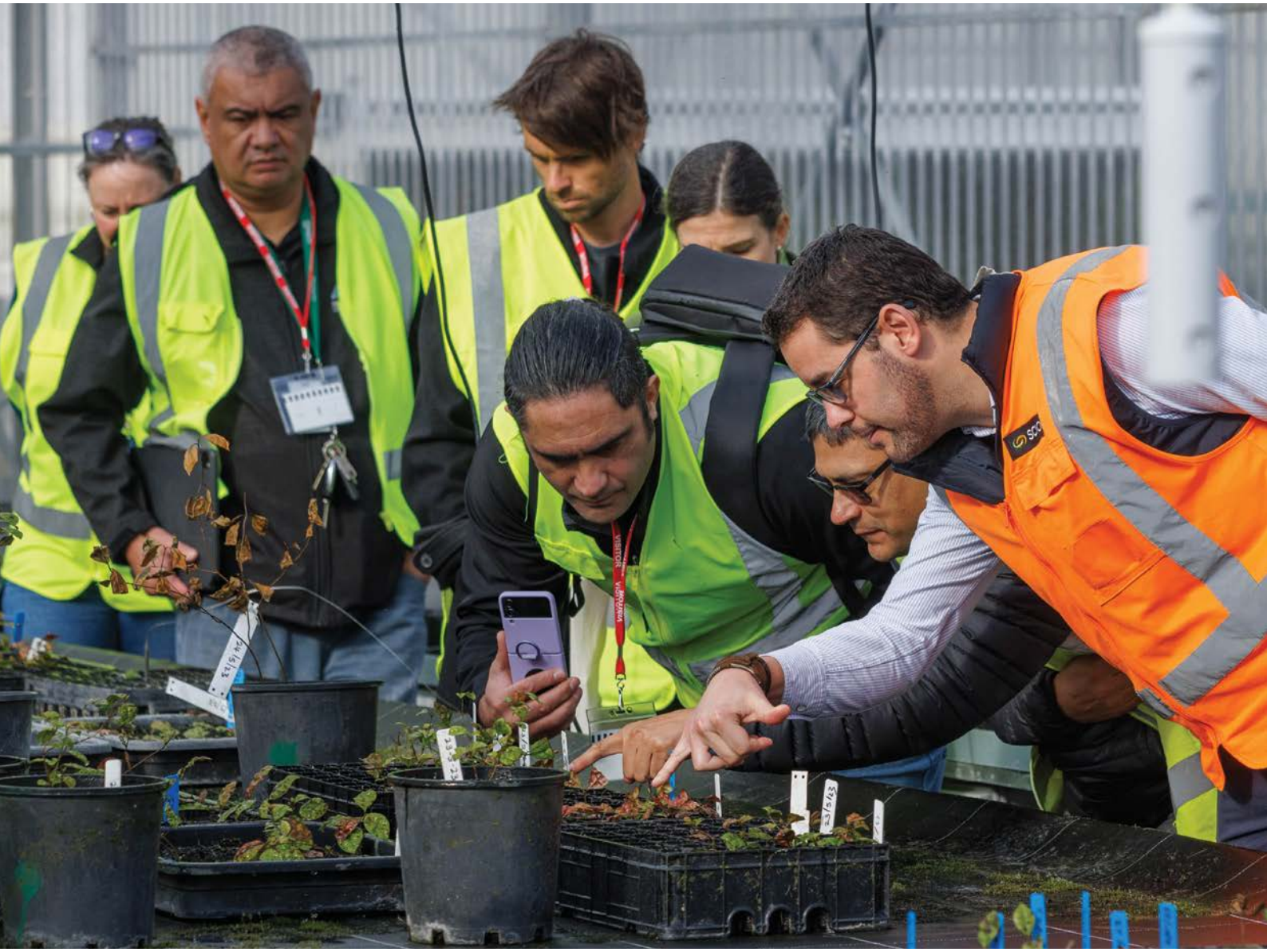
Working alongside the Rotoiti 15 Trust, the programme is developing knowledge in myrtle rust, working with, and for, mana whenua. It has 10 full-time staff, up from eight when it was first launched last year.

Myrtle rust poses a threat to the country's most iconic plants, including pōhutakawa, mānuka and rātā, as well as commercially grown species such as eucalyptus.

Scion forest pathologist and project leader Julia Soewarto spent the past year upskilling the local team in environmental monitoring and mapping sites around the Rotorua lakes area.

As a result, the team now knows the specific location of vulnerable species under threat from myrtle rust around the Rotoiti, Rotomā and Okataina lakes. The team has established monitoring transects at these sites and will keep an eye on them over the 2023 summer.

Arapeta Tahana from Rotoiti 15 Trust says he and his fellow trustees are committed to providing opportunities for the taiao – environment, culture and people.



Forest pathologist Darryl Herron shows Rotoiti 15 Trust chairperson Arapeta Tahana and Ngāti Tamateatūtahi Ngāti Kāwiti hapū member Nelson Meha where cuttings are showing signs of new growth.

"This is logical for us to invest in our own people. To increase capacity for learning for our whenua – land while protecting our ngahere – forests. This is not the sort of work you can outsource," Tahana says.

"The goal is to provide jobs and build capability within the Bay of Plenty to protect the ngahere against myrtle rust."

Project participants are not only working in the forests but are also exposed to Scion's laboratories and nursery. As part of their job, they are upskilled in several areas of forest biosecurity science.

The three-year programme is funded by the Department of Conservation and Ministry for the Environment – Te Papa Atawhai, Jobs for Nature fund.

Read more: scionresearch.com/ar23-myrtle-rust

He Ringa Ahuwhenua, He Hanga Mahi Indigenous Forestry Strategy Development

Ngāti Hine Forestry Trust continues to lead this kaupapa in its second year with a focus on new and unique approaches to Māori-led indigenous land and forest systems. The project is funded through the Te Uru Rākau – New Zealand Forest Service's One Billion Trees initiative and supported by Scion. It aims to develop a transitional strategy to shift from the dominance of pine to rākau Māori through rangahau and mahi tahi, wānanga and indigenous forestry trials. This project is significant because it not only considers a kaupapa Māori approach, but it is also unique to Ngāti Hine mātauranga through a rangahau philosophy that focusses on Te tū o Ngāti Hine, kaitiakitanga, mahi tahi and He Whenua Hua, He Tangata Ora. Scion and other partners provide support to the co-design of the final trial with understanding the critical inputs, importance and availability of plant species and rākau taketake types, and their prevalence in the past, present and future. The work will be confirmed at trial sites selected within the Ngāti Hine rohe.

Māori trusts and incorporations own $4.3 billion of assets in forestry and have ownership of more than 30% of land under plantation forestry as well as large areas of indigenous forest. Around 8,300 Māori work across the forestry and wood processing sector, making up 22% of the workforce (Te Uru Rākau, 2022).

Te Ara Pūtaiao – Indigenous knowledge exchange

In June 2023, Scion's interim general manager Te Ao Māori, Shontelle Bishara (Ngāti Tūwharetoa, Ngāti Kahungunu, Rongomaiwahine), journeyed to Canada and Hawaii as part of an indigenous knowledge exchange.

The visit was led by Te Ara Pūtaiao, a pan-CRI Māori Leadership Group working to create space and opportunities for whanau, hapū and iwi to lead, collaborate and grow mātauranga Māori across Aotearoa's research, science and innovation system.

This exchange allowed Te Ara Pūtaiao to share learnings between the Indigenous Peoples of Canada, Kānaka ʻŌiwi/Native Hawai'ian and Māori regarding the application of indigenous knowledge and approaches, and indigenous-led solutions to ensure greater participation and leadership of indigenous peoples in knowledge development.

In a report-back on the visit, Te Ara Pūtaiao wrote: "As climate change further impacts our environments, utilising indigenous knowledge is vital. Iwi and hapū have been monitoring the changing climate for centuries, building a deep base of knowledge and insights. We believe it is important to move to an approach that utilises both modern science and traditional knowledge to apply targeted, fit-for-purpose interventions and mitigations."

Bishara says while she was careful not to compare the past experiences of Māori with the others, these shared experiences, similar considerations and aspirations made for mutually beneficial learnings and exchanges of knowledge. Through the exchange, she identified specific areas of opportunity for future collaboration and research aligned with Scion's Impact Areas, including indigenous value chains, clean energy, food-growing systems, food security and food sovereignty.

From here, the Te Ara Pūtaiao roopū will begin work on the development of a relationship plan with the intention of reciprocating the manaakitanga they were shown, welcoming their international hosts to Aotearoa and connecting them with critical partners.

As a result of the exchange, the strategic position of Te Ara Pūtaiao is enhanced to champion new ways of harnessing and applying science and indigenous knowledge that enables global collaborative programmes of research. Te Ara Pūtaiao see this as a major opportunity arising from these global relationships.

Portfolio highlight: Restoration, protection and mauri of Te Waonui a Tāne

A new approach to working at Scion, with the principles of Te Tiriti at its heart, is making steady progress in bringing about change. Through early engagement with Māori, enhanced communication and the development of new tools, greater success will be achieved.

Why it matters

- The unique indigenous forest ecosystems of Aotearoa are undergoing increasing stress from multiple threats.
- By respecting and embracing a Te Tiriti approach to science and research, researchers and Māori partners can identify greater opportunities and shared benefits, impacts and outputs.

The Restoration, protection and mauri o Te Waonui a Tāne portfolio is Scion's leading Te Tiriti framed portfolio within the impact area, Forests and Landscapes. It comprises two programmes, or pathways: one is a Te Ao Māori-led pathway with science supporting and the other is science-led with consideration for Te Ao Māori partnerships and participation made as work is developed.

This approach has already enhanced existing research and will become more embedded so that new projects value Te Ao Māori world views and the ngahere knowledge is enriched through methods largely unexplored by science.

The work will deliver increased benefit for Māori, for the community and for Aotearoa.

Portfolio leader and indigenous research practitioner Katerina Pihera-Ridge, says Māori have a great deal to offer research and science, particularly in the environmental space. However, research has often seen indigenous people left out of the conversation, without access to the science gathered and unable to contribute holistic perspectives, approaches and values that traditional knowledge holds.

"That means missed opportunities and lost benefits for te taiao – natural environment and people. We need to do a better job of collaborating so we can understand the state of the ngahere and respect what each other's worldview brings.

"When we engage early with Māori and take more time to communicate our research, projects and science, then we see a more holistic view emerge, bringing shared research benefits, positive relationships and more opportunities."

The first year of work has been spent establishing a framework and strategy, bringing staff on the journey and increasing the visibility of the portfolio, as well as supporting research and science approaches and capability both internally and externally. While progress has been steady, these are long-term objectives needing long-term commitments.

Some of the projects completed include the development of Te Mata Ārahi Ngahere – Ngahere Compass (internal guidance for connected action for impact) that will guide the portfolio in ways of working more holistically and with Te Tiriti values taken into account.

Another project, Ngā Toi a Tāne, saw the development of a ngahere rangahau research report and creative research outputs. This includes kōrero tuku iho, tohu, karakia and waiata that acknowledge mātauranga and the interconnected relationships Māori have associated with ngahere.

Now in post-production is Ngā Ataata Rokiroki o te Waonui, a Kaupapa Māori led approach to share knowledge via five short videos expanding themes of forest landscapes, biosecurity, biodiversity, wildfire science and Te Ao Māori, that have been developed for basic knowledge transfer, accessible to Māori and community audiences.

Alongside these new initiatives, the portfolio continues to contribute to existing and new work focussed on preparing for and responding to climate-enhanced risks to ngahere and standing forests, including pests, pathogens, fire and socio-ecological research.

The portfolio is also focussed on growing its profile with government and research partners and aims to demonstrate to Māori that there is a science portfolio that respects Te Ao Māori kaitiakitanga approaches.

"Māori need to see that room is being made in science, that they can guide research ideas, approaches and that they can get involved. It is about enabling a Māori-led approach that is supported by science, not just the other way around," Katerina concludes.

Bidois, M. (2023). Te Wehenga: The Separation. Aotearoa, NZ.

Impact area: Forests to biobased products

Activities in this impact area are needed to deliver New Zealand's net-zero 2050 emissions aspirations. Success is not possible without using renewable biobased materials and energy, that replace and outperform current carbon-intensive equivalents.

Scion is working with partners in industrial value chains to accelerate solutions that will create regional jobs, unlock investments and put New Zealand on track to meet our global climate commitments.

Impacts are delivered through our four research portfolios.

This past year, we have taken some big steps towards achieving the goals of our strategy. In October we welcomed the opening of the Ecogas facility in Reporoa – New Zealand's first commercial scale anaerobic digestion bioenergy plant. The opening comes six years after the technology it is using was piloted together with Scion.

Once fully operational, the $30 million facility will turn 75,000 tonnes of organic food waste into renewable clean energy and biofertiliser, while providing 40 jobs. Our relationship with Ecogas continues today as we explore further research opportunities.

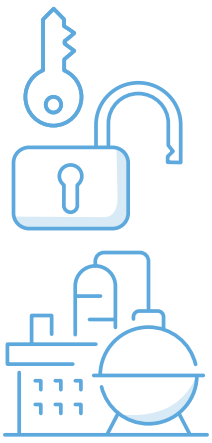
We have also been working with partners to accelerate the development of regional New Zealand through de-centralised, distributed and circular manufacturing. Our thinking in this space and the innovations we are delivering, formed part of the Forestry and Wood Processing Industry Transformation Plan launched in November.

Scion's programme includes the development of small-scale, modular biorefining processes and collaboration with regional partners to develop opportunities in new value chains and markets.

Distributed manufacturing, the right process for the right product in the right region, is receiving more and more interest, accelerated by the impact wrought by Cyclones Hale and Gabrielle. We are currently working on an immediate solution to forestry woody debris in the form of a mobile, container-sized mini-factory to process forestry waste on site, turning it into new high-value products.

For more information on distributed manufacturing, visit our website.

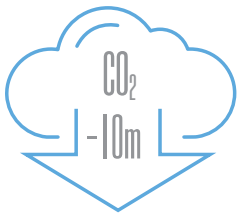
Goals Targeting solutions that impact several industrial value chains resulting in:



1 Unlocking future investment for new infrastructure such as biorefineries.

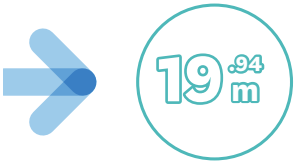
2 $20 billion sustainable GDP growth driven through existing and new companies.

3 Substituting fossil energy and materials with sustainable alternatives.

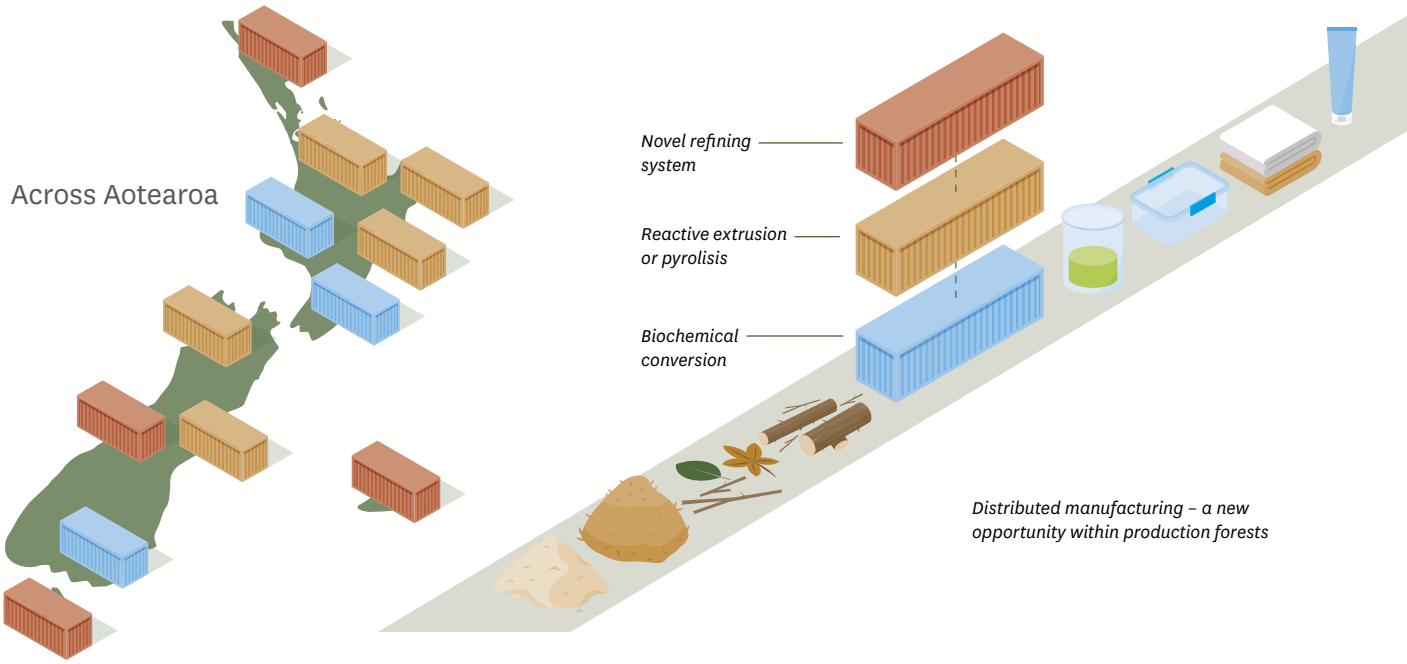


4 10 million tonnes reduction in CO2 equivalents.

5 2500 new regional and rural jobs.



Investment in FY2022-23: $19.94 million, 30%



Distributed manufacturing – a new opportunity within production forests

This past year we have also made significant progress in the areas of biotech, cleantech and advanced biomaterials. Examples include waste to bioplastics and feed – engineering bacteria to make bioplastics from biomass or CO_2 and methane; exploring tree species modification to ensure trees can capture twice as much carbon as before and developing customised biomass for biorefineries, accelerating New Zealand's move away from petro chemicals.

A fantastic example of just what the future could hold for us all, can be seen right now on the Chatham Islands. Scion is honoured to be working alongside local communities and other CRIs on a five-year programme focussed on creating self-sustainability and restoring an ancient landscape. It is an inspiring story of what can be achieved when driven by the principles of a circular bioeconomy.

Read more in Scion's Connections Magazine, Issue 43, June 2023, Change in the Chathams.

Research portfolios

High-value biorefineries

Making high-value chemicals and materials in New Zealand from sustainably sourced trees and other biomass. Targeting goals: ① ② ⑤

Bioproducts and packaging

Enabling onshore manufacturing of bioproducts and packaging from New Zealand's natural resources for global markets. Targeting goals: ② ③ ⑤

Distributed and circular manufacturing

Kick-starting a distributed, circular bioeconomy that brings economic, social and environmental benefit to our regions by using the resources of today and tomorrow. Targeting goals: ② ③

Integrated bioenergy

Positioning bioenergy as part of the transition away from fossil fuels. Targeting goals: ③ ④

Climate technology startup Cetogenix: A decades long connection to Scion, to Rotorua and the commercialisation of science

While Cetogenix is finding solutions for the disposal of organic waste, they also provide a home-grown example of how collaboration drives innovation and will boost regional economic growth.

Why it matters

- Partnerships bring technology out of the lab and into the commercial world creating local and regional impact.
- Partners can help equip current and future scientists with experience in the challenges of translating science and technology into real world business solutions.

Climate technology company Cetogenix is a developer of systems for organic waste to renewable energy conversion. It is addressing some of the most significant challenges presented by disposal of the world's 1.5 billion tonne, annual organic waste streams: value recovery, environmental impacts, and processing cost.

This year, the company successfully attracted $4.5 million in seed capital investment.

The Cetogenix connection to Scion and Rotorua runs deep. All members of the leadership team are former Scion employees and in August they moved into new offices at the Te Papa Tipu Innovation Park.

Their work uses technology originally developed at Scion and in 2019, the company's lead investor, Pacific Channel, obtained exclusive global rights to Scion intellectual property around the conversion of organic wastes into bioeconomy feedstocks.

A Scion-Cetogenix Memorandum of Understanding (MOU) is in place, to enable both parties to continue to work together as this technology is scaled-up and deployed. As an example of the MOU's value, Scion was recently successful in securing a significant grant from the BioResource Processing Alliance to help scale-up the Cetogenix technology.

Both companies agree that strong science-commercial partnerships will accelerate innovation and deployment.

Cetogenix managing director Dr Trevor Stuthridge says it's always been a challenge bringing new technologies out of the laboratory, as science has traditionally worked in isolation of the end-user.

"Partnerships are a hugely valuable vehicle for the development of future technologies. Working closely with CRIs and universities allows us to explore some of the riskier tech concepts that industry may not necessarily have the budget, time or capacity for," he says.

Read more here: scionresearch.com/ar23-cetogenix

Power in partnership: The Cetogenix team (back row) Dr Trevor Stuthridge, Dr Daniel Gapes, Marcel van Leeuwen, Rahul Dhiman. (front row) Dr Ursula Hosking, Rob Lei, Alex Stuthridge, Ciara Griffiths, Dr Donya Novin and Dr Okey Nwadigo.

Clothes to roads: Innovation explores untapped resource

Credit: Rosa Woods, Stuff.

Scion is supporting UsedFULLY with technology that can turn unwanted textiles into an ingredient used to create New Zealand roads.

Having secured new funding, Scion and commercial partner UsedFULLY are now advancing plans to turn unwanted textiles into fibre, using it to reinforce roading.

Why it matters

- About 220,000 tonnes of waste textiles are sent to landfill in New Zealand each year, or they are exported overseas.
- This solution has the potential to reuse this waste, create jobs and could result in potential greenhouse gas emissions reduction of 400,000 tCO_2 per year.

UsedFULLY is a New Zealand company providing onshore solutions for unwanted clothing and textiles. Utilising Scion's refining technology, they have developed a process for deconstructing waste textiles and transformed them into a new high-value product – an ingredient for roading called StrengthTex.

The roading industry currently imports about 100 tonnes of cellulose each year from Europe to use in the roading mix to stabilise it, improve its workability and homogeneity, and to strengthen the final roading surface. The hope is that this can be replaced with the recycled textile fibre additive, StrengthTex.

A roading trial last year led by UsedFULLY and Wellington City Council tested StrengthTex using asphalt – a first for New Zealand. Now additional funding has been secured through Waka Kotahi Transport Innovation Fund – Hoe ki angitū and MBIE's PreSeed Accelerator Fund, to further the research.

In these next stages, the research will explore a fuller range of applications including its compatibility with chip seal, currently used on 75% of New Zealand roads. It is the next critical step needed to prove the technology's viability as a roading performance-enhancing additive.

Additional research will examine whether there are any environmental concerns from microplastics or microfibres and demonstrate how there are no negative carbon/greenhouse gas consequences associated with the process and products.

A final research focus will prove that textile asphalt can be recycled by combining it with new asphalt – a requirement by contractors.

Read more: scionresearch.com/ar23-textile-recycling

Patents filed for compostable plant pots

Together with commercial client Wilson and Ross Limited, Scion developed a biodegradable nursery pot which will help nurseries and gardeners to reduce plastic waste and carbon emissions.

Why it matters

- Plastic waste is an issue for nurseries and gardeners with an estimated 350 million plants in pots produced each year.

The biodegradable pots, made from biopolymers and a biofiller, had to meet the requirements of a nursery, last at least 12 months above ground then, after it's planted in soil, continues to biodegrade. The pot then provides fertiliser for the plant as it breaks down, supporting plant growth.

Manufacturing of the pots will scale up after production processes are finetuned using funding received from the government's Plastics Innovation Fund. The pots are expected to be commercially available by the end of 2023.

The new product uses biopolymers made from sustainably grown sugarcane, cassava or corn, combined with a biofiller of waste organic matter. Diverting that waste into a product like this adds value in the manufacturing process which is the basis of the circular bioeconomy.

Scion's scientific discovery during the testing phase has resulted in the filing of two international patents.

While people have explored the idea of creating biodegradable plant pots for at least 10 years there are many formula combinations and permutations to consider. Discovering a formula that works is a significant success.

In addition to significant private investment, funding support over the past four years of research has come from Callaghan Innovation, Auckland Council's Waste Minimisation Fund and the Ministry for Primary Industries through its Sustainable Food and Fibre Futures Fund.

Read more: scionresearch.com/ar23-biopots

Impact area: Forests to timber products

From providing carbon sequestration to regional growth and opportunity, forests and wood-related products have long been a staple of the New Zealand economy and a source of wellbeing for its people.

However, with complex and ever-changing market environments and the dominance of a a single species *Pinus Radiata*, the forest and wood products sectors need transformation.

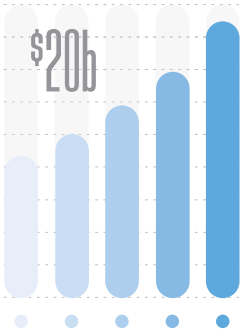
Impacts in this area of work are delivered through four research portfolios.

Our collaboration with others continues to deliver impact for the forestry sector and the country. Over the past year, the Specialty Wood Products Partnership initiative team successfully completed all project deliverables and reports. The initiative's partners have been working together, coordinated by Forest Growers Research, to enable future funding opportunities and are currently developing their roadmap for forestry diversification. This has the potential to support workstreams that would progress the work of the partnership.

Progress is being made in the Ngāti Hine Forestry Trust's project under the One Billion Trees (1BT) programme, a four-year project to develop a transitional indigenous forestry strategy, with Scion's support. See story page 15. Research trials are planned for winter 2024 and over 10,0000 plants of tōtara, kahikatea and pūriri have been grown at Scion and are being delivered for future planting.

Like many others, our teams were impacted by Cyclone Gabrielle which resulted in difficulties accessing our research sites, damage and delays in the delivery of some programmes. However, the extreme weather events of the year also focussed our attention on how our research can support in the recovery. Our Digital Forests team were able to quickly map the impact of the cyclone on East Coast forestry, while the Forest Flows programme has gathered invaluable data on how forest hydrology performs in extreme weather events.

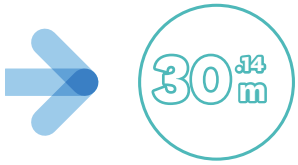
Goals Via the forest, manufacturing and construction industries, we aim to:



1 Increase GDP by $20 billion through low emissions, forest diversity, timber products and sustainable and healthy communities.

2 Reduce CO2 emissions by 10 million tonnes from the adoption of circular principles.

3 Have New Zealand embrace forests as a core element of a circular bioeconomy.



Investment in FY2022-23: $30.14 million, 45%

We are also accelerating our work in the biosecurity space as climatic changes increase the risks our sector faces. The year ended with the highly successful Resilient Forests Research Programme conference, with a focus on mitigating the effects of climate change on tree heath and industry productivity. This was the first conference since 2019 and it was great to see everyone back.

Finally, and on the subject of conferences, the team are thrilled to have successfully secured the ForestSAT conference to be hosted in Rotorua in September 2024. ForestSAT has become the pre-eminent conference on the application of spatial analysis and remote sensing technologies for forest monitoring, modelling and description.

Research portfolios

Trees to high-volume wood products

Transforming plantation forestry in New Zealand to deliver diversified, productive, sustainable and climate adapted forests. Targeting goals: ① ②

Trees to high-value wood products

Unlocking the value of wood products from diverse exotic forests to deliver a low-carbon built environment. Targeting goals: ① ② ③

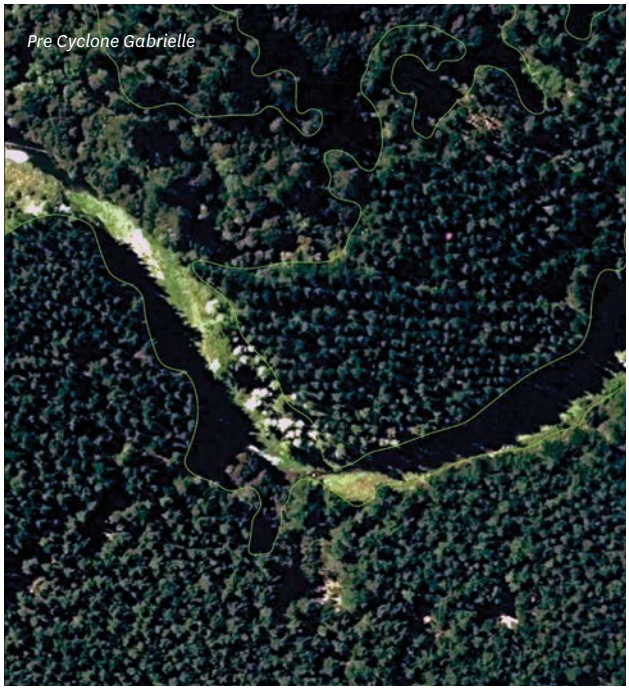
Distinct value indigenous wood products

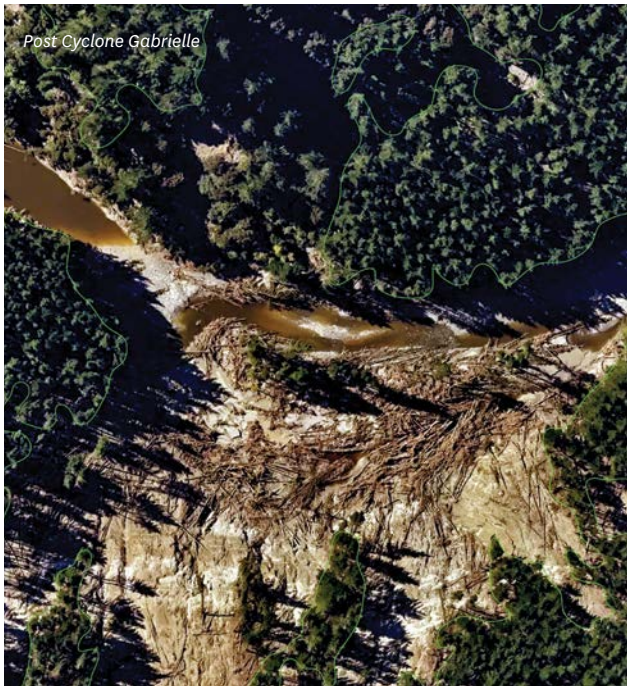
Amplifying innovative indigenous value chains to deliver distinct value wood products for the wellbeing of Tāne and his children. Targeting goals: ① ②

New value digital forests and wood sector

Enabling smart decisions through interconnected data, by championing digitalisation and automation through the life of the forest and the harvested wood products processing chain. Targeting goals: ① ②

Digital Forests project maps the impact of Cyclone Gabrielle





AI generated forest boundaries pre and post-cyclone on a tributary of the Tutaekuri River, Waiwhare, Hawke's Bay.

Scion's Remote Sensing team made a quick 180° turn following Cyclone Gabrielle, combining aerial images and artificial intelligence (AI) to map the impact of the cyclone on forestry, helping local authorities understand the damage that was caused to planted forests and to plan for the future.

Why it matters

- The use of technology can provide significantly improved data more effectively and efficiently.
- It can also speed up the process of gathering information and determining responses.

The work is part of Scion's Digital Forest Project which has a long-term aim of creating a national-scale digital inventory of New Zealand forests which will allow for a more accurate description of their location and the valuable resources they contain, such as timber and carbon.

The SmartForest AI model uses high-resolution aerial photography to detect planted exotic tree species and map forest stand boundaries. A deep learning-based model has been developed, that can accurately detect and map planted forests using only red-green-blue or RGB aerial imagery. The AI model can map stands as early as two to three years after planting, once a minimum canopy size is reached.

Cyclone Gabrielle provided the first opportunity where the technology could be used to measure the impact of a natural disaster. The team saw immediate value in repurposing their AI model to quantify the forest loss and damage in using a range of imagery sources.

The information collected can be used by councils, forestry companies and other stakeholders to help them understand what's happened and support them to make more informed land and forest management decisions.

An immediate assessment of the Gisborne-Tairāwhiti region showed that many closed canopy forests had suffered significant damage with many landslides and a considerable amount of woody debris sitting on slopes or on the river margins.

Gisborne District Council is now working with Scion to rapidly assess the loss of net stocked area in these forests.

Researchers are using this data to assess forest loss and damage caused by Cyclone Gabrielle such as windthrow and slips, as well as gaining insight into associated hazards such as woody debris.

Read more here:
scionresearch.com/ar23-gabrielle
smartforest.cloud

When the rain pours, where does the water flow?

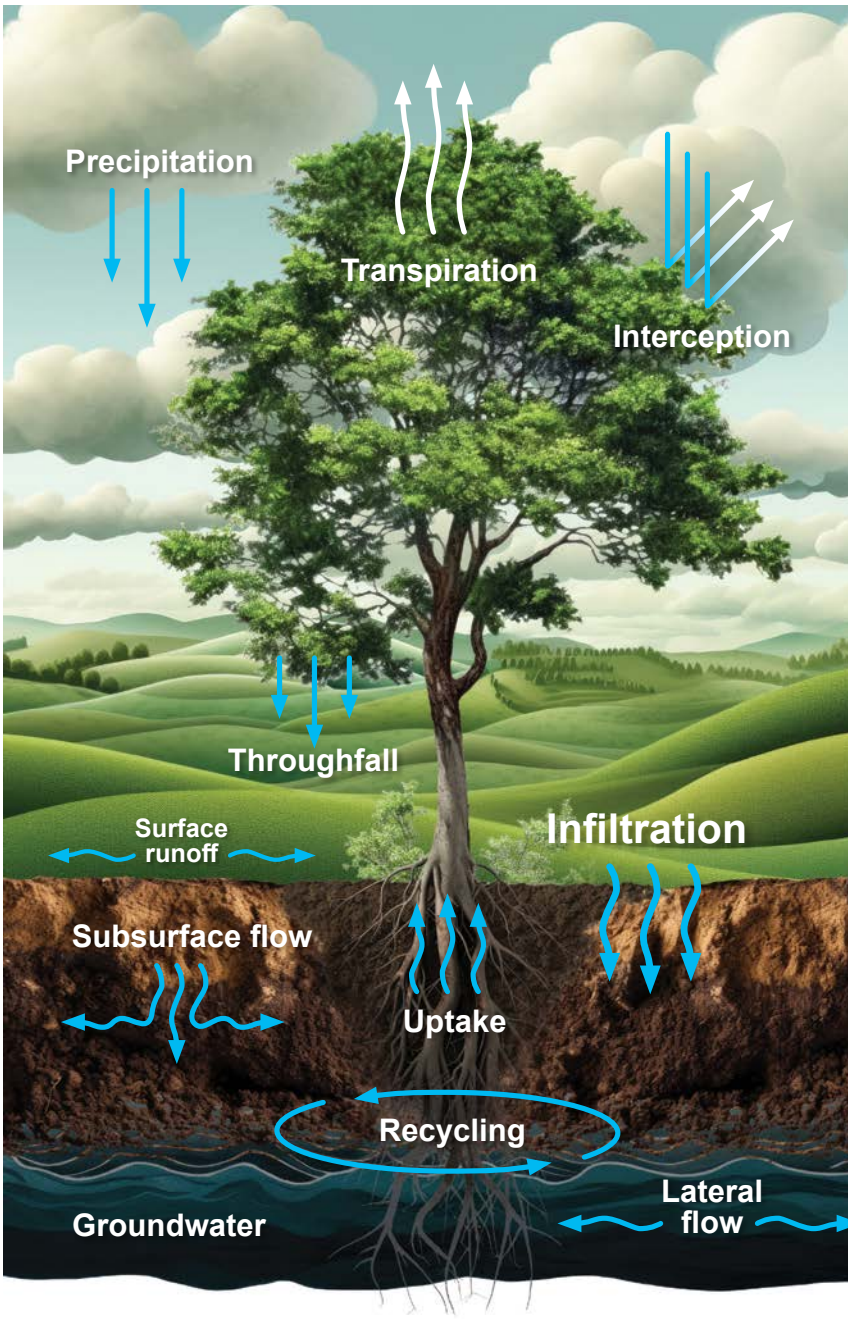
The Forest Flows programme used the extreme weather events of January and February this year to help explain water movements within forests and how forests absorb and stabilise rain during extreme weather events.

Why it matters

- The impact of climate change on New Zealand is expected to bring more extreme weather events.
- A better understanding of the flow of water through the forest will help to identify markers for sites that are vulnerable to hillslope failure.

The MBIE Endeavour-funded Forest Flows research programme is investigating how increased atmospheric moisture, due to human-caused climate change, influences water movements in the forest. This research can help inform how to manage forests best to mitigate the effects of extreme rain events. The research programme is in its fourth year.

There are seven primary research sites across New Zealand including those that experienced severe storms in January and February 2023. Sensor networks installed at the research sites captured data on how rainfall moves and is stored in radiata pine catchments during extreme events. As a result, the sites provided for the first time, direct measurements in unprecedented detail from sensors continuously recording data at five-minute intervals.



Scion and a team from NIWA analysed rainfall, soil moisture, stream flow and groundwater recordings to create a picture of how water moved through the forests during those extreme events. The data gathered will help inform forest managers and government about the ability of planted forests to absorb precipitation during extreme rainfall events, and if the forests can provide stability to hillsides.

For example, analysis of the 27 January 2023 event at one site in the Mahurangi Forest found that the catchment was able to retain 59% of the 229mm of rainfall that fell in a single weather event. Few studies have found such high retention rates in planted forests with such high rainfall before.

Read more here: scionresearch.com/ar23-sponge

Research to future-proof planted forests rated "leading edge"

Research and smart technologies are offering hope and solutions to growers needing to create more resilient planted forests and mitigate the effects of climate change on tree health and productivity.

Why it matters

- The impact of climate change on pine forests poses a risk for managers wanting to grow better quality wood for export and meet the local demand for high-value biobased products and fuels.
- There is also a need to protect carbon sequestered in post-1989 forests, as New Zealand is highly dependent on these forests for meeting its carbon obligations.

Scion's Resilient Forests Research Programme was developed in 2019 with support from industry, to mitigate market uncertainty and future proof radiata pine forests from the effects of climate change.

An independent review of the programme this year commended the team for the overall scientific quality of the work. The review found the quality of the work, in a national and international context, to be 'leading-edge' in a number of areas including wood quality tools and phenotyping, and tree microbiome.

The review panel noted that the programme addresses short-to-long term needs of industry and stakeholders, and that the level of industry engagement is very good. However, the panel also noted that the communication of research findings and technology transfer can always be improved upon.

The panel recommended more focus could be given to understanding alternate species, and on the role of biodiversity in enhancing resilience. It also recommended that the biosecurity focus could be strengthened and in particular, collaboration with Australia could enable the sharing of scarce research capacity.

This year, the programme delivered its annual conference, for the first time since 2019 due to COVID-disruptions. Over two days, a range of research topics was shared with participants including a review of New Zealand's forest companies' sustainability activities, exploring how companies report on sustainability and research relating to the monitoring, modelling and control of red needle cast including research trials that have examined the timing for applying fungicidal sprays, and their effectiveness.

Insights into Scion's methods for controlling and predicting red needle cast and the application of cutting-edge technology were also shared.

The programme has been funded to the tune of more than $18 million over four years from Scion's Strategic Science Investment Fund and the Forest Growers Levy Trust.

Read more here: scionresearch.com/ar23-resilient

Presentations from the conference are available here: scionresearch.com/ar23-conference

Impact area: Forests and landscapes

New Zealand's current standing permanent forests, scrub and wetlands provide non-market value ecosystem services estimated to be worth billions in perpetuity[1] and standing native forests are highly valued.

The establishment of new, permanent forests and landscapes provide a range of eco-system services including carbon sequestration, nitrogen regulation (avoided leaching), erosion control, natural pollination, flood regulation, waste treatment, water supply protection, recreation and species conservation and biodiversity.

Impacts in this area of work are delivered through three research portfolios.

Our work is providing the knowledge, innovation and tools for establishing new, permanent forests, and protecting our existing standing ngahere – native forests.

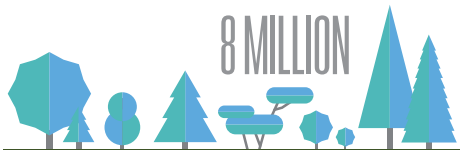
As the foundational year for our portfolio roadmaps, some programmes are in year one of delivery. One such portfolio is the Restoration, protection and mauri of Te Waonui a Tāne – a unique portfolio across Scion with Te Tiriti principles firmly at the centre.

Other programmes are well established and have been running for several years. This was the second year of our *Are we ready for extreme wildfire?* programme which builds on 28 years of rural fire research delivered in partnership with national and international agencies.

Other long-standing programmes include our work to protect indigenous forests against myrtle rust. More than 30 researchers at Scion have been involved in myrtle rust programmes and this year we achieved a significant breakthrough with the development of an early detection tool.

Goals Via permanent standing forests we aim to achieve:

1. 100% increase in afforestation of highly erodible red zone land.



4. 8 million tonne increase in sequestered above and below ground carbon storage in new forests.

2. 100% increase in the value of Māori standing forests with maximum carbon net returns defined by landowner values.

3. 100% increase in the use of forests for human health and wellbeing.

5. 80% increase in forested area managed to enhance soil and water resources, biodiversity, landscape resilience.

6. Converting 30% of underutilised Māori land to standing forest plantations.

Investment in FY2022-23: $15.48 million, 22%

1. *Patterson, M. G., & Cole, A. O. (2013). 'Total economic value' of New Zealand's land-based ecosystems and their services. In J. Dymond (Ed.), Ecosystem Services in New Zealand: Conditions and Trends (pp. 496-510). Manaaki Whenua Press. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.825.5760&rep=rep1&type=pdf ; and*

   Yao, R. T., & Velarde, S. J. (2014). Ecosystem services in the Ōhiwa catchment (A commissioned report submitted by Scion to the Bay of Plenty Regional Council. https://www.boprc.govt.nz/media/395767/ecosystem-services-in-the-ohiwa-catchment.pdf

Kauri microshoots

Indigenous afforestation is a growing research area within Scion. This year we have received numerous requests from industry and hapū to assist with developing plans to establish permanent native forests. Our focus to date has been on building relationships and partnerships, working closely with small Māori land management businesses and our government partner Te Uru Rākau – New Zealand Forest Service.

Like others, our research was affected by Cyclone Gabrielle with access to sites impacted and some damage incurred, delaying the delivery of some programmes. However, we were also able to apply our knowledge to support communities affected by the cyclone.

We responded to a call from Mana Taiao Tairāwhiti leaders seeking researchers to review a range of publications in preparation for the Tairāwhiti submission to the Ministerial Inquiry into Land Use. The project team summarised 11 papers and delivered them within the two-week timeframe.

This year our impact area has had a major focus on carbon in our Carbon Secure Forests programme. Projects are delivering to national and international carbon reporting requirements, increasing our understanding of carbon sequestration and the impact of climate change and exploring the deep carbon stored in New Zealand's soils.

Research portfolios

Establishing indigenous forests

Enabling New Zealanders to recloak the whenua by helping to establish indigenous forests that are resilient and thriving, bringing health, wealth and wellbeing to communities, ecosystems and the environment. Targeting goals: ① ⑤ ⑥

Restoration, protection and mauri of Te Waonui a Tāne

Ko te Whakahaumanu, Ko te Whakamaru, Ko te Mauri Ora o Te Waonui a Tāne me Te Ao Tūroa – Restoration, protection o Te Waonui a Tāne for intergenerational prosperity and perpetuity. Targeting goals: ② ③ ⑤

Designing forests – Mahi tahi whaihua

Designing forests to meet the needs and values of communities that restore and enhance New Zealand's natural capital, delivering sustainable and resilient ecosystem functions and equitable outcomes over generations and within a rapidly changing environment. Targeting goals: ① ③ ④ ⑤

A world first in fire research

Snow on the hills leading up to Aoraki Mount Cook provided a spectacular icy backdrop for Scion's fire and atmospheric scientists in May. They were part of an international research team who burned wilding slash piles as part of a world first experiment aimed at protecting firefighters and communities from the devastating impact of future wildfire events.

IMAGE CREDIT: Samuel Aguilar.

The Rural Fire Research group's mission is to develop the science and technology needed to protect life and property and manage fire in the landscape. This year, with their collaborators and assistance from Fire and Emergency New Zealand (FENZ), they delivered a world first result.

Why it matters

- Worldwide and in New Zealand, the occurrence of extreme wildfire is accelerating.
- The direct cost of wildfire on New Zealand's economy in 2020 was $142m. By 2050, this is predicted to cost $547m each year due to increased risk resulting from a warming climate.

In a world first, Scion and its partners have successfully generated fire whirls using woody debris pile material, gaining more knowledge on how to protect firefighters from unexpected fire behaviour.

Fire whirls, also known as fire vortices or fire tornados, occur during extreme wildfire events but until this research, they had never been deliberately created in the field and at the scale that was achieved.

The experiments were designed to isolate the fire whirl outside a wildfire and study the factors that cause fire whirls to form which in turn will help to identify 'watch out' signals for firefighters.

The research group committed more than $1 million worth of specialist atmospheric motion detection and fire behaviour equipment to monitor, measure and analyse the fire whirls.

The team used specialist equipment to measure the temperature inside the fire whirl, the inward wind flow, and atmospheric conditions within and outside the fire environment.

Scion research lead Hugh Wallace says the burns were aimed at increasing the understanding of thresholds: atmospheric, environmental, fire intensity and fuel condition that must be crossed to generate a fire whirl.

"When these are understood, we can better predict their cause and spread."

The *Are we ready for extreme wildfire* programme builds on the past 28 years of rural fire research in New Zealand. The five-year programme, running from 2021-2026, is funded by MBIE and industry. It is delivered in partnership with the US Forest Service, Missoula Fire Science Laboratory, University of New South Wales, San Jose State University, US Forest Service Pacific Northwest Laboratory, the University of Canterbury, Lincoln University and The Nature Conservancy.

The programme comes off the back of the successful five-year programme *Preparing New Zealand for extreme fire* which ran from 2016-2021, funded by MBIE and industry.

Scion would like to thank FENZ, Department of Conservation and all the volunteers who assisted through FENZ with the burns and the local Twizel fire brigade for their in-kind support in achieving these burns.

Read more here: scionresearch.com/ar23-fire

Deep soil carbon

Forests are carbon-rich ecosystems; in biomass alone, they comprise over 80% of the world's above ground carbon stocks. However, forest ecosystems can have deep rooting systems and soils that also store carbon meters down. Deep forest soils are forgotten when it comes to carbon accounting. Researchers at Scion are on a mission to uncover more.

Why it matters

- Current approaches only account for carbon in the first 30 centimeters of soil, however, we know that extensive deposits can exist much deeper.
- Little is known about the size of distribution of this soil carbon, how it is affected by land-use, or if deposits are growing or declining in size.

If more is known about this massive national reservoir of forest soil carbon, we can better assess climate change risks and respond with evidence-based plans and actions.

Scion scientists are investigating deep soil carbon with the aim of building a more comprehensive research programme to further investigate the critical role and function of deep forest soils.

To date, the team have completed a series of smaller projects to help guide what should come next.

These include a review of what is already known, identifying the critical importance of quantifying subsoil carbon stocks for accurate carbon accounting, and a case study that holds the data of deep soil carbon stocks from 13 sites on contrasting soils around New Zealand.

This year, the team also published the paper *Soil depth as a driver of microbial and carbon dynamics in a planted forest (Pinus radiata) pumice soil* in research journal SOIL. The case study dug deep into the subsoils of Puruki Experimental Forest and captures the changes in organic carbon and the soil microbiome, at a series of soil depths.

They have conservatively estimated that more than 35% of total carbon stocks are present in subsoil layers deeper than 30 cm.

Ongoing work will start to provide a fuller picture of the amount, type and age of carbon deeper in soils, and soil processes that are influencing soil carbon persistence.

Through these pieces of research, the team are building a platform upon which a more comprehensive programme could be built to further investigate the critical role and function of deep forest soils.

Future research could help identify if the net carbon pool under planted forests is increasing or decreasing in size, provide information on how the land was previously used and managed, and build additional understanding of the role of deep soil carbon in supporting a range of ecosystem benefits.

The work is funded by MBIE's SSIF with the review paper delivered in collaboration with USDA and Oregon State University.

Soil percussion auger - taking an intact soil core down to one metre, which tells us the nutrient stocks on site in the soil.

Hope in the fight against myrtle rust with early detection tool

More than 30 researchers at Scion have been involved in myrtle rust research programmes, working to ensure New Zealand's indigenous forests are protected into the future. This past year, the development of an early detection tool became another critical addition to the tool kit for managing myrtle rust.

The research team included (clockwise from top) Michael Bartlett, Peter Massam, Dilshan de Silva, Honey Estarija, Elizaveta Graevskaya, David Cajes and Michael Watt.

Why it matters

- Myrtle rust poses a threat to the country's most iconic plants, including pōhutakawa, mānuka, and rātā, as well as commercially grown species such as eucalyptus.
- Repeated severe infection can cause decline or death of large trees.

Scion has found a way to quickly detect myrtle rust days before plants show signs of infection, providing hope that nurseries in the future can start control treatment much sooner and stop disease outbreaks in their tracks.

In a major breakthrough, thermal imagery and hyperspectral data were used to detect myrtle rust pre-visually, on a susceptible host, rose apple, for the first time. The method presents opportunities to develop new tools around the early detection of myrtle rust.

The open access findings have been published in the journal *Phytopathology*.

Lead author of the research, principal scientist Dr Michael Watt said that by using predictions made on a validation dataset, models using indices derived from thermal imagery were able to pre-visually distinguish infected plants from control plants with 100% accuracy, one day before symptoms appeared and for all stages after early symptoms appeared.

Compared with control plants, plants with myrtle rust had lower and more variable canopy temperature, which was associated with higher stomatal conductance and transpiration.

"These results have prompted the team to expand their research to include other vulnerable species from the myrtle family, starting with Eucalypt species in spring," he says.

Project leader Elizaveta Graevskaya says the hope is that this sophisticated technology and research can be used to develop a robust detection methodology that will benefit commercial nurseries in the future.

"The technology also has potential to be used in the field, and at a larger scale because the thermal and hyperspectral equipment can be mounted on drones," she says.

The Manaaki Whenua Landcare Research-led, MBIE programme, Beyond Myrtle Rust (BMR), is a collaborative, multi-faceted research programme that Scion participates in. BMR has helped to deliver research that investigates the genetic diversity and adaptive potential of myrtle rust pathogen populations, environmental drivers of sexual spore production, and the seasonal progression and impact of disease on vulnerable native myrtles. Scion researchers are busy wrapping up these projects as the programme is now in its final year of funding.

For more: scionresearch.com/ar23-myrtle-rust-2

Our People

Scion is committed to being a good employer and promoter of equal employment opportunities.

Our people and performance practices and organisational values help the good employer principles to thrive by building a culture and working environment that supports empowerment, diversity, equity, inclusion, innovation and accountability.

We fulfil the good employer obligations through our Board Good Employer Policy and our Equal Employment Policy, along with our management policies, programmes and practices.

Our delivery in 2022-2023 is summarised below.

Leadership, accountability and culture

During the period Scion continued its Active Manager Programme ensuring a consistency of language and practice for all our people managers. This encompasses practical management and leadership skills such as delegation, difficult conversations and personal organisation, and is delivered via individual learning, group collaborations and one-to-one coaching with assigned internal mentors. Feedback remains extremely positive and ongoing participation is high.

As a result of change experienced across the organisation, this past year we embarked on a cultural renewal journey. It has included deep dive sessions with various cohorts throughout the organisation and resulted in two streams of work: reviewing and refreshing our organisational values and mindset and, supporting our leaders to lead a positive, people-centred culture with vision, purpose and clarity. These projects are ongoing, however initial signals and feedback have been positive.

Staff engagement is measured annually through our Pulse survey. Results from the 2023 survey saw a small rise in comparable engagement index of 2% from 2022. Notable areas of improvement were people receiving feedback that helps them improve their performance (up 15%) and senior leaders better demonstrating employees are important to Scion's success (up 8%).

Recruitment and selection

Our recruitment and selection practices ensure we recruit the best person for the job. Discriminatory terms and bias are excluded from our recruitment practices, and our interview panels follow the principles of the Human Rights Act 1993.

Recruitment continues to be affected by the government's immigration settings resulting in challenges for potential overseas candidates. The biggest impact is still the length of time to get a new employee into New Zealand and restrictions regarding residency entitlement.

We continue to be involved with the Ma Te Ara Putaiao ka taea group to develop a CRI Māori Graduate Pathway to increase the pipeline of Māori researchers.

During summer, we engaged 28 university students who provided excellent feedback at the end of the programme.

Employee development, promotion and exit

Some 42 staff applied for career progression resulting in 37 promotions. The technologist pathway continues to enable those who focussed on applied science, to progress their career.

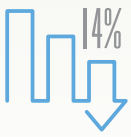
Turnover of permanent appointed employees was 13.9%, a pleasing decrease from 17.9% in turnover from the previous year. Exit survey results were positive overall, with 84% recommending Scion as an employer (an increase of 6% from the previous year). Primary reasons given for leaving were career alignment and remuneration.

Flexibility and work design

Flexible ways of working options were trialled this past financial year, including options for regular working from home, flexible hours and a nine-day fortnight.

Since the implementation of the trial, chargeable hours have been trending up, staff turnover and outstanding annual leave balances have reduced.

37 internal promotions



Turnover decreased from 18%

84% of departing staff recommend Scion as an employer

Gender pay gap decreased from 11.6%

Zero notifiable injuries

A recent Pulse survey indicated that 87% of staff agree that Scion allows them to balance both work and personal needs, while 36% of all comments indicated that what helps people succeed at Scion was “flexibility and work balance”.

Rotorua staff are encouraged to make the most of the neighbouring Whakarewarewa Forest during breaks, and the Rotorua campus remained dog friendly.

Remuneration, recognition and conditions

Remuneration is based on job bands and remuneration ranges are sourced from external market surveys produced by Korn Ferry Hay Group. Benchmarking of our internal position and salary data is done against the All of Organisations Public Sector and CRI-R&D job family surveys to accurately allow us to set a competitive pay position for Scion. Annually we work with the PSA Union and our Board of Directors to set the remuneration budget.

Collective negotiations for 2022-23 year were conducted within the Public Service Commission’s guidance, concluding with a ratified settlement.

Scion continues to provide supportive paid sick leave to all employees. We recognise the continuing impact of the pandemic on individuals and their families, and the importance of staying home when sick. Over the past year 98 staff received sick and domestic leave beyond the legislative allowance. Scion also maintained an income protection and life insurance policy available to all permanent staff.

The 2022-23 year saw an overall reduction in the gender pay gap to 6.3%, down from 11.6% (in 2021-22). Our annual Staff Recognition Awards were successfully held to celebrate the outstanding contributions Scion people made to the organisation.

Safe and healthy environment

Scion provides staff with the necessary skills to address relationship issues. Policies are in place to deal with problem resolution and challenging behaviour. Facilitated processes and discussions continued to positively resolve interpersonal issues and improved working relationships. No formal complaints of bullying were substantiated.

Scion staff can access the Employee Assistance Programme (EAP) for support with workplace and personal matters. This year, 49 staff used the service, up from 44 staff last year. Most issues resulting in EAP calls were personal (80%) rather than work-related. When work-related issues were reported, these related to career and conditions, which are any physical condition issues in the workplace that is impactful to staff wellbeing.

Scion continued to promote staff well being and improve the health and safety environment, such as taking a learning team or safety differently approach to collaboratively manage identified risks, removing the blame culture.

We have continued to build relationships with industry for example, delivering health and safety culture talks with Timberlands and have collaborated with Toi-Ohomai to improve our safety with solid wood manufacturing. Scion joined the Business Leaders’ Health and Safety Forum.

Working with the facilities team, we have updated our Asbestos Policy and Management process and our Contractor Management processes to align with industry best practices. We awarded 18 staff with monthly Health and Safety Awards.

The year ended with no notifiable injuries and three lost-time injuries. There were 28 incidents and 55 near misses reported, compared with 36 incidents and 64 near misses reported in 2021-22.

A company-paid influenza vaccination was taken up by 150 staff.

Workplace profile at 30 June 2023

Total staff

348

348 total permanent employees

18»1»11

18 fixed-term, 1 student, post-doc and 11 casual employees

51»49

51% male and 49% female

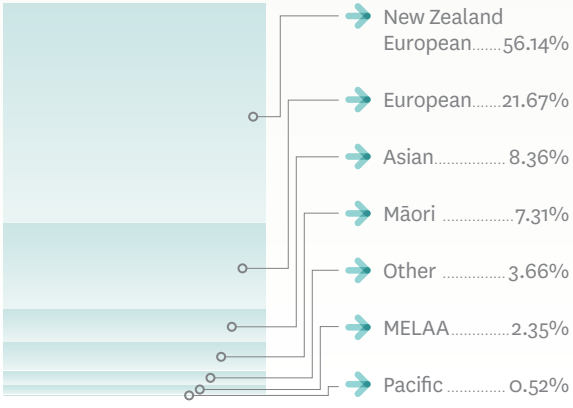
FTEs

318

318 total full time equivalent (FTE) permanent employees

Excludes 13.9 fixed-term, student, post-doc and casual employees

Nationality



Awards and accolades

Science New Zealand Team Award recipients (from left) Taryn Saggese, Mark West, Alyesha Candy, David Hooks, Diahanna O'Callahan, Christophe Collet, Sumanth Ranganathan, and Gareth Lloyd-Jones.

Individual/Lifetime Achievement Award recipient principal researcher Dr Mike Watt.

Early Career Researcher awardee Dr Angelique Greene.

Awards and nominations

- Chemist Eva Gaugler was part of the House of Science New Zealand team that won the United Kingdom-based Royal Society of Chemistry's Horizon Prize for Education 2022. Scion developed A Load of Rubbish, a circular economy science kit focussed on sustainable ways of making and remaking new products to design out waste.
- Principal scientist Dr Brian Richardson was awarded the New Zealand Plant Protection Society's medal for championing forest protection for nearly four decades.
- Entomology team lead Stephanie Sopow was awarded the Peter Molan trophy for Exceptional Contribution to Apiculture at Apiculture New Zealand's annual conference. She was also nominated by Apiculture New Zealand for a New Zealand Biosecurity Science Award 2022 for the multi-year Biological Control of Giant Willow Aphid project.
- The Scion team, and partner AgriSea, won a Primary Industries Award at the Kudos Awards. The team were congratulated for their work building on Scion's pulping expertise and AgriSea's 26 years in seaweed processing, resulting in a novel seaweed hydrogel. The win came after AgriSea won the New Zealand Hi-Tech Kamupene Māori o te Tau – Māori Company of the Year Award for 2022. The award highlighted the company's work with Scion.
- Scion was a joint winner in the Australasian Emergency Media and Public Affairs (EMPA) Awards for Excellence in Communication 2022. Lisa Langer, Simon Wegner and Andrea Grant and former Scion employees Grant Pearce and Nathanael Melia received the Research Category Award on behalf of the Rural Fire Research Group's winning project "Adapting and mitigating wildfire risk due to climate change: extending knowledge and best practice emergency response".
- The Science New Zealand annual awards were held on 6 December at Parliament. Scion's proud award recipients were:
  - Dr Mike Watt, Principal Researcher – Individual/Lifetime Achievement
  - Dr Angelique Greene, biopolymer scientist – Early Career Researcher
  - CVC Vaccine Biotech Team – Team Award. The team included Taryn Saggese, Mark West, Alyesha Candy, David Hooks, Diahanna O'Callahan, Christophe Collet, Sumanth Ranganathan, and Gareth Lloyd-Jones.
- A Myrtle Rust consortium that includes Scion's myrtle rust experts were finalists in the Federated Farmers 2022 Primary Industries New Zealand Awards, in the Guardianship and Conservation (Kaitiakitanga) Award category. The team is made up of 70 researchers across iwi, government and industry.

Environmental performance

Head office in Rotorua

Scion's Rotorua site is a Toitū enviromark gold certified facility.

This year under our decarbonisation programme, we completed a detailed assessment of our boiler needs with WoodBeca. This work continues our progress toward the aim of phasing out the use of natural gas at this site by 2030.

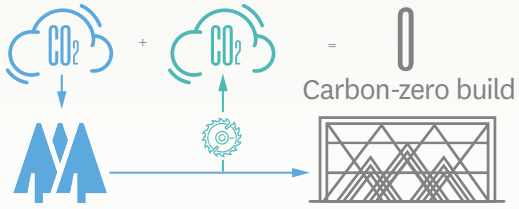
Installation of new chillers as part of our main chiller system has started. Replacement of the 30 year old main chiller system will increase efficiency and allow the move to a lower global warming potential (GPW) refrigerant. The chiller system upgrade is supported by 40% co-funding through the State Sector Decarbonisation Fund.

We have also installed electrical sub-meters across our transformer network allowing for better monitoring of the electrical load across different areas. This information will be used to increase our electrical efficiency over the coming years. This work was supported by Energy Efficiency and Conservation Authority (EECA) co-funding.

The weight of waste picked up from bins at our main site was 37.86 tonnes, 4.8 tonnes less than during 2021-22. Our waste diversion activities resulted in 2.2 tonnes of organic waste and 5.8 tonnes of scrap metal being diverted from landfill. The organic waste included 1.4 tonnes of food waste going to our vermicompost system on site and 0.8 tonnes of used coffee grounds taken home by staff for composting.

Our recycling programme at Rotorua continued with 14.4 m³ of milk bottles, glass bottles and steel cans picked up by a waste management company for recycling. Cardboard and paper recycling went directly to Oji Fibre Solutions for fibre recovery at the Kinleith and Penrose mills. E-waste was sent to the local e-waste recycling centre. Used alkaline, lead acid and lithium polymer batteries were sent for recycling. Old mobile phones were also collected for recycling through the ReMobile scheme.

Te Whare Nui O Tuteata



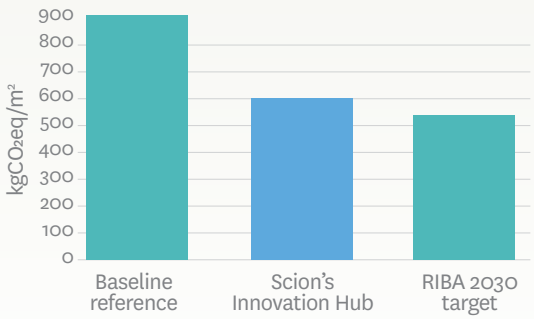
- 454 tonnes CO2-eq stored in wood 459 tonnes CO2-eq emitted during materials manufacturing and building construction

- 418 tonnes of CO2-eq stored in the structure of this building – equivalent to the emissions from 160 people taking return flights from Auckland to London

- 550m³ is the same amount of structural timber from just 4ha of radiata pine forest

- Diagonal grid structures (diagrids) are an efficient way to provide strength and stiffness and require less material than traditional structures

- Engineered timbers used are laminated veneer lumber (LVL), cross laminated timber (CLT) and Glulam



- At 561 kg CO_2-eq/m², whole-of-life embodied carbon in the building is very close to the 2030 Royal Institute of British Architects (RIBA) target

Staff contributions

Our people are actively involved in helping reduce environmental impact. Initiatives this past year included rethinking how water was used in the timber kilns on-site; initiation of soft plastic collection at our main site and “chilling-up” our ultra-low temperature (ULT) freezers from -80°C to -70°C, where possible. “Chilling-up” has two major benefits: it can reduce energy consumption by 30-40%, and in doing so it can prolong the life of our ULT freezers.

Trees that count

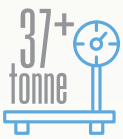
Income from recycling metal, broken science equipment and 15,470 aluminium cans supplied by Rotorua staff (and from roadside clean-ups) was used to purchase 114 indigenous trees for restoration work through the Trees that Count programme. This brings Scion’s total number of indigenous trees planted through this initiative to 230 trees.

Carbon emissions

Carbon emissions for the 2022-23 year will be reported separately this year following independent verification. Our report will be shared on our website, under the Sustainability page. On this page you can also find our Environmental Performance Policy and our Supplier Code of Conduct.

Sustainability at Scion

WASTE COLLECTED FROM SITE



37.86 tonne

Down by 4.8 tonne on 2021–22 total of 42.68 tonne

SENT FOR RECYCLING

14.4 m³ of milk bottles, glass bottles and steel cans

WASTE DIVERTED FROM LANDFILL

2.2 tonne of organic waste

1.4 tonne of food waste going to our vermicompost system on site

0.8 tonne of used coffee grounds taken home by staff for composting.

5.8 tonne of scrap metal

Corporate governance

Scion's Board of Directors is appointed by its shareholding ministers: the Minister of Research, Science and Innovation and the Minister of Finance. All members of the Board are independent.

The responsibility of the Board is to guide and monitor the business of Scion and its subsidiaries including:

- Reviewing and approving Scion's strategy and Statement of Corporate Intent
- Adopting policies of corporate conduct (including risk management and delegations of authority) and ensuring that systems and procedures are in place to carry out those policies
- Adopting annual operating and capital plans and budgets
- Monitoring performance against key objectives and budgets on a monthly basis
- Ensuring Scion proactively meets all health and safety requirements
- Evaluating the performance of the Chief Executive
- Reviewing and improving the effectiveness of the Board.

The Board operates in accordance with Scion's constitution. It has up to seven Directors who meet up to 11 times over the year either in person or by video conference. The Board may retain independent advisers, including independent legal counsel or other experts, as it deems appropriate.

The Board has three standing committees: the Audit and Risk Committee, the People and Culture Committee and the Master Plan Committee.

Audit and risk

The function of the Audit and Risk Committee is to assist the Board in discharging its responsibilities regarding financial reporting, regulatory conformance and matters of risk management. The committee is the liaison point for internal and external auditors, it assesses the performance of financial management (the investment cases for major items of capital expenditure), reviews audit findings, the annual financial statements and interim financial information, and has oversight of the development and review of policies to ensure compliance with statutory responsibilities.

People and culture

The function of the People and Culture Committee is to assist the Board in the establishment and regular review of remuneration and organisational policies and practices, and to assist the Board in discharging its responsibilities relating to the appointment, remuneration setting and review of Scion's Chief Executive. The committee also approves the appointment and remuneration of executives, and inputs into and monitors achievement of the annual health and safety plan.

Master plan

The objective of the Master Plan Committee is to provide master planning oversight to the design, build and operations of facilities and significant capital investments across all locations and make recommendations to the Board. All discussions are made with full consideration to mana whenua.

Committee membership and workplans

Each standing committee comprises no less than three members of the Board, appointed by the Board from time to time and meets at least twice annually and intersessionally as required. All Directors are entitled to attend all committee meetings.

While the Chair of the Board is an ex-officio member of each committee and has full voting rights, they may not be chair of the Audit and Risk Committee. All discussions are to be made with full consideration to mana whenua. For the Rotorua campus those principles have been set out in the kawenata between Ngā Hapū e Toru and Scion which was signed in August 2022 and is available to read in Te Reo and in English.

Each committee establishes annual workplans and undertakes an annual review of its objectives and responsibilities and its terms of reference. Each committee also makes regular reports to the Board. The Board's risk management policy and procedures involve formal reporting by management of the most significant risks Scion is exposed to, and the Board regularly monitors management of those risks. There is also regular monitoring and reporting on progress in meeting recommendations made by external auditors.

Directors' report

Principal activities

New Zealand Forest Research Institute Limited (trading as Scion) is a company registered under the Companies Act 1993. Our principal activity is to conduct research in accordance with the purpose and principles specified in Sections 4 and 5 of the Crown Research Institutes Act 1992 (the Act). Scion has met all the obligations under the Act for the year ended 30 June 2023.

Scion, a Crown Research Institute, is a science and technology company delivering solutions to both commercial and government clients. While the principal research campus is in Rotorua, there are also offices in Christchurch and Wellington.

Our core purpose is to drive innovation and growth from New Zealand's forestry, wood product and wood-derived materials and other biomaterial sectors, to create economic value and contribute to beneficial environmental and social outcomes for New Zealand.

Scion's strategic plan is set out in the Scion Strategy to 2030. The strategy provides a long-term direction and programme of work to deliver Scion's core purpose and deliver great outcomes for New Zealand nationally and regionally. The strategic goal is helping New Zealand transition to a circular bioeconomy, and Scion will do this through three research impact areas: Forests and landscapes; Forest to timber products; and Forests to biobased products.

Scion's *Statement of Corporate Intent 2022-2025* sets out our goals for each research impact area and outlines our focus on:

- Climate change response
- Circular bioeconomy
- Partnering with Māori
- Regional economic development
- Enabling scale up for new bioeconomy enterprises.

Scion has two wholly owned subsidiaries (Te Papa Tipu Properties Limited and Sala Street Holdings Limited) and has a 14.56% shareholding in Biopolymer Network Limited.

Te Papa Tipu Properties Limited owns the group's land assets.

Sala Street Holdings Limited is currently a dormant holding company, its investment Terax 2013 Limited having been liquidated during the 2021-22 financial year.

Biopolymer Network Limited's purpose is to create technologies for advancing the utilisation of renewable biobased materials in industrial applications. Scion does not have director representation nor voting rights.

Summary of group financial results to 30 June 2023

	2023 $000	2022 $000
Operating revenue	64,321	58,716
Profit/(loss) before tax	683	510
Taxation expense	(139)	(87)
Profit/(loss) after tax	544	423
Net comprehensive income attributable to shareholders	29	880
Equity		
Issued and paid up capital	17,516	17,516
Retained earnings	35,916	35,372
Reserve	524	1,039
Total equity	53,953	53,927

The state of the company's affairs

A commentary on the year's performance is outlined in the Chair's and Chief Executive's report (page 1), and in the opinion of the Directors, the state of the company's affairs continues to be satisfactory.

Dividend

No dividend was recommended for the year ended 30 June 2023 (2022: $0k).

Donations

No donations were made during the year (2022: $0k).

Executive remuneration

Executive remuneration is managed within the terms and conditions of the Executive Remuneration Policy, summarised below. This policy sets out remuneration elements and design principles informing the remuneration arrangements for executive management. Remuneration practice throughout Scion is transparent in the way in which it is determined and administered and will always conform to sound corporate governance principles.

The People and Culture Committee oversees the application and implementation of the executive remuneration policy.

Pay principles offer clarity and guide decisions around executive remuneration that ensure fair, competitive and appropriate pay for the markets in which Scion operates. Scion's executive pay principles aim to achieve the following:

- To pay executives at a level commensurate with their contribution to Scion and appropriately based on skill, experience and performance achieved.

- The level of remuneration paid is considered appropriate for motivation and retention of the calibre of executive required to ensure the successful formation and delivery of Scion's strategy and management of the environments in which it operates.
- Executive remuneration is set having regard to typical pay levels across organisations of a similar size along with public sector guidance.
- When reviewing remuneration, the committee considers all relevant factors, including
  - Prevailing market and economic conditions
  - Organisational performance and individual experience and contribution
  - Internal equity and pay parity
  - Accurate benchmark position and job size
  - Market benchmark survey results.

Executive pay position and structure

Scion participates in industry and profession-based market salary surveys using external remuneration consultants Korn Ferry Hay to understand what the market is paying for roles like ours.

Executive remuneration consists of base salary, Kiwi Saver contributions and benefits, which makes up total remuneration.

The Base Salary and Total Remuneration Position in Range of individual executives are reviewed against the All Organisations Public Sector Base Salary Market Median Line and the All Organisations Public Sector Fixed Package Market Median Line.

Scion aims to position executive remuneration at the appropriate Position in Range (PIR) of the relevant All Organisations Public Sector Market Median Line.

Total executive remuneration for the 2022/23 financial year excluding Chief Executive remuneration was $1,479,487 (2021/22 $1,503,057).

Chief Executive remuneration

The structure of the Chief Executive's remuneration is consistent with the prior year being:

	2023 $000	2022 $000
Base salary	506,505	470,176
Benefits comprising KiwiSaver contributions, additional leave and insurance.	15,195	31,835
Total remuneration	521,700	501,987

In addition to the benefits noted above, the Chief Executive receives three days company holidays, consistent with all Scion employees and 25 days annual leave. The difference between the previous and this financial year was a vehicle which was part of the Chief Executive package, but no longer is.

Employee remuneration

Section 211(1)(g) of the Company's Act requires the disclosure of the number of people paid in excess of $100,000 in bands of $10,000. Remuneration and compensation included performance awards, superannuation benefits, and KiwiSaver subsidy. Some other benefits were not quantified and are therefore excluded, including staff parking, home broadband and membership of relevant professional societies.

Bands	Number
$500,000 – $509,999	1
$280,000 – $289,999	1
$240,000 – $249,999	1
$220,000 – $229,999	1
$210,000 – $219,999	1
$200,000 – $209,999	1
$190,000 – $199,999	2
$170,000 – $179,999	4
$160,000 – $169,999	2
$150,000 – $159,999	3
$140,000 – $149,999	7
$130,000 – $139,999	6
$120,000 – $129,999	28
$110,000 – $119,999	18
$100,000 – $109,999	35
Total	111

During the year ended 30 June 2023, $104,086.59 was paid to four employees in relation to cessation of employment with Scion (2022: $184,336 to six employees). Cessation payments included $47,086.59 for retirement benefits for one employee (2022: $35,082 for two employees).

Company Directors

There were no changes in Directors in FY2022-23.

Directors' interests

Any business the company has transacted with, or organisations in which a Director has an association has been carried out on a commercial 'arms-length' basis.

Directors' interests included in the interest register during the year are:

	Director's interests	Relationship
Helen Anderson	Antarctica NZ	Director
	Anderson Associates NZ Ltd	
	Studio Pacific Architects and parent company Nationwide Architects Ltd	Chair
	The Nature Conservancy NZ Ltd	Advisory Board Member
	AWPT Ltd	Director
	Ministry of Foreign Affairs & Trade	Member, Risk & Assurance Committee
	Informing New Zealand Beef (INZB)	Chair
	Hōhepa Wellington	Trustee
Stana Pezic	Cerbere Investments Ltd	Director
	Pink Ice Ltd	
	NZFF Holdco Ltd and subsidiary companies	Director
Jon Ryder	Oji Oceania	Director
	Wood Processors and Manufacturers Association	Deputy Chairperson
	The Wood Council of New Zealand	Director
	Bearing 360	Chairperson
	Forestry and Wood Processing Industry Transformation Plan Advisory Group	Member
Greg Mann	ArborGen ANZ Ltd Partnership	Employee
	MBIE Tissue Culture Project	Member – Programme Governance Group
Steve Wilson	SW Holdings 2021 Ltd (formerly Talbot Technologies Ltd)	Director and Shareholder
	Industry Transformation Plan for Advanced Manufacturing Working Group	Member
	Product Accelerator Advisory Board	Co-Chair
	Design Energy (Robotics)	Advisor and Investor
	Te Papa Tipu Properties Ltd	Director
Brendon Green	Watercare Services Ltd	Director
	Kaitiaki Advisory Ltd	Director and Shareholder
	Tainui Kawhia Incorporation	Director
	Hiringa Energy Ltd	Director
	Hiringa Refueling Investments Ltd	Director
	Tainui Kawhia Minerals	Management contract
	Wattstock LLC (USA)	Australia-NZ representative
	Te Whakakitenga o Waikato Tainui	Representative of Waipapa Marae, Kawhia
	Runanga Manukau Institute of Technology	Te Whakakitenga o Waikato representative
	Te Taumata Aronui – Ministry of Education	Advisor
	University of Canterbury –Department of Chemical Engineering Adjunct	Adjunct Senior Fellow
	Waikato Regional Skills Leadership Group	Co-chair
	Construction and Infrastructure Workforce Development Council	Member

Directors' remuneration

Director	30 June 2023	
Helen Anderson	58,000	Chair
Brendon Green	29,000	
Greg Mann	29,000	
Stana Pezic	31,000	Chair – Audit and Risk Committee
Jon Ryder	36,250	Deputy Chair/ Chair – People and Culture Committee
Steve Wilson	33,000	Chair – Master Plan Committee
Total	**$216,250**	

Subsidiary entities

Steve Wilson, Dr Julian Elder and John Kahukiwa are Directors of Te Papa Tipu Properties Limited. There were no changes to Directors during the year and no remuneration was paid to these Directors for the year ended 30 June 2023.

The Directors' interests are:

Director name	Director's interests	Relationship
Julian Elder	The Elder Group	Director
	Sala Street Holdings Ltd	Director
	Te Papa Tipu Properties Ltd	Director
	New Zealand Forest Certification Association	Chair
John Kahukiwa	Te Papa Tipu Properties Ltd	Director

Use of company information

During the year no notices were received from members of the Board requesting to use Scion information received in their capacity as Directors which would not otherwise have been available to them.

Directors' indemnity and insurance

Scion has insured all Directors and the Directors of its subsidiaries against liabilities to other parties (except to Scion or a related party of Scion) that may arise from their position as Directors. The insurance does not cover liabilities that may arise from criminal actions.

Auditor

In accordance with Section 21 of the Crown Research Institutes Act 1992, the Office of the Auditor General is auditor for the company and, pursuant to Section 29 of the Public Finance Act 1977, has appointed Ernst & Young to undertake the audit on its behalf. Auditor remuneration is detailed in note 4 to the financial statements.

Dr Helen Anderson QSO
Chair

Dr Julian Elder
Chief Executive

Measuring performance

PERFORMANCE

Financial performance targets

Indicator name	Actual 2023	Budget 2023	Actual 2022
Efficiency			
Operating margin	**11.8%**	7.5%	10.4%
Operating margin per FTE	**$21,754**	$13,316	$19,354
Risk			
Quick ratio	**3.06:1**	1.02:1	2.70:1
Profit volatility	**31%**	21.0%	36.2%
Forecasting risk	**2.5%**	2.6%	4.8%
Growth/investment			
Adjusted return on equity	**1.0%**	(1.4)%	0.8%
Revenue growth	**9.5%**	12.2%	(3.9%)
Capital renewal	**0.63x**	2.3x	1.2x
FTE	**350**	387	330
Revenue per FTE	**$183,774**	$175,208	$185,810

Summary of group financial results to 30 June 2023

	2023 $000	2022 $000
Operating revenue	**64,321**	58,716
Profit/(loss) before tax	**683**	510
Taxation expense	**(139)**	(87)
Profit/(loss) after tax	**544**	423
Net comprehensive income attributable to shareholders	**29**	880
Equity		
Issued and paid up capital	**17,516**	17,516
Retained earnings	**35,916**	35,372
Reserve	**524**	1,039
Total equity	**53,953**	53,927

CRI generic performance indicators

Indicator name	Measure	2022/2023 Target	2022/2023 Actual	
End user collaboration	Revenue per full-time employee (FTE) from commercial sources	$60,377	$67,276	Achieved
Research collaboration	Publications with collaborators (Peer-reviewed publications from Scopus database)	90	100	Achieved
Technology and knowledge transfer excellence	Commercial reports per scientist FTE	>2.0	1.5	Not achieved
Science quality	Impact of science publications – mean citation score	3.5	5.08	Achieved
Financial indicator	Revenue per FTE	$175,208	$183,774	Achieved

Additional performance indicators

Indicator name	Measure	2022/2023 Target	2022/2023 Actual	
Stakeholder engagement	Relevant partners (number and %) that have a high level of confidence that Scion sets research priorities relative to the forest industry and biomaterials sector	>85%	95%	Achieved
	Relevant partners (number and %) that have a high level of confidence in Scion's ability to assemble the most appropriate research team	>90%	Not gathered	See note 1 below
	Relevant end-users (%) who have adopted knowledge and/or technology from Scion.	>90%	53%	Not achieved See note 2 below
Māori economic development	Partnerships (number (n) and value ($)) established with Māori entities to support economic development through the forest industry	n>15 $2.5m	22 >$2.5m	Achieved See note 3 below
Accelerated commercialisation	Technologies in Scion's pipeline (number and co-investment ($)); projects that progress to the business case stage (case studies)	25 and $500,000; 2 cases to validation stage	21 and $714,543; Cases 4	Two of three factors achieved
Good employer	Staff engagement	>80%	59%	Not Achieved See note 4 below
	Staff retention – staff turnover	12%	13.9%	Not Achieved See note 5 below
	Health and safety – serious harm events	0	0	Achieved
	Staff diversity – % of permanent staff of Māori decent	>12%	7.3%	Not Achieved
	Gender neutral – pay equity (Median – total compensation unexplainable differences below <5%)	<5%	6.3%	Not Achieved See note 6 below

Notes:

1. The 2023 Stakeholder Survey did not ask this question in favour of alternative questions on performance. See page 8 for more data from the survey.
2. Survey recipients included a number of non end users (i.e. funders and collaborators). As it was anonymous, it is not possible to segment end-users from non-end users. Of the respondents who self-identified as end-users of Scion's research, 77% report that it has 'made an impact' on their organisation.
3. Within this annual reporting period, Scion had 22 projects with Māori entities that directly or indirectly support economic development through the forest industry. Some relationships existed prior to this year. The research and development investment allocated to these projects is $10.2 million, not all of which is allocated toward Māori economic development.
4. An increase of 2% on last year.
5. A decrease from 17.9% in 2021-22. Exit survey data shows 84% recommend Scion as an employer (an increase of 6% from the previous year).
6. The 2022-23 year saw an overall reduction in the gender pay gap down from 11.6%.

Financial Statements

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

FOR THE YEAR ENDED 30 JUNE 2023

	Note	ACTUAL 2023 $000	BUDGET (unaudited) 2023 $000	ACTUAL 2022 $000
Revenue	2 (a)	**64,321**	67,861	58,716
Other Income/(Expenditure)	2 (b)	**17**	-	13
Expenditure	3 (a)	**(63,643)**	(68,827)	(57,145)
Finance Costs	3 (b)	**(12)**	(17)	(16)
Share of Profit/(Loss) of Associates		**-**	-	(58)
Profit Before Tax		**683**	(983)	510
Tax Expense	9	**(139)**	273	(87)
Profit/(Loss) for the year after tax		**544**	**(710)**	423
Other comprehensive income that will not be reclassified to profit or loss in subsequent periods net of tax				
Remeasurement gain/(loss) on Defined Benefit Plan		**8**	-	121
Revaluation of Carbon Units		**(523)**	-	336
Total other comprehensive income, net of tax		**(515)**	**-**	457
Total comprehensive income for the period attributable to the shareholders of the parent company		**29**	**(710)**	880

The accompanying notes form part of these consolidated financial statements.

CONSOLIDATED STATEMENT OF CHANGES IN EQUITY

FOR THE YEAR ENDED 30 JUNE 2023

	Note	Ordinary Shares 2023 $000	Asset Revaluation & Pension Reserve 2023 $000	Retained Earnings 2023 $000	Total 2023 $000	Ordinary Shares 2022 $000	Asset Revaluation & Pension Reserve 2022 $000	Retained Earnings 2022 $000	Total 2022 $000
GROUP									
Balance as at 1 July		**17,516**	**1,039**	**35,372**	**53,927**	**17,516**	**582**	**34,949**	**53,047**
Profit for the period				544	544	-	-	423	423
Other comprehensive income		-	(515)	-	(515)	-	457	-	457
Total comprehensive income		-	(515)	544	29	-	457	423	880
Balance as at 30 June	**5**	**17,516**	**524**	**35,916**	**53,956**	**17,516**	**1,039**	**35,372**	**53,927**

The accompanying notes form part of these consolidated financial statements.

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

AS AT 30 JUNE 2023

	Note	ACTUAL 2023 $000	BUDGET (unaudited) 2023 $000	ACTUAL 2022 $000
Equity				
Share capital	5	**17,516**	17,516	17,516
Revaluation reserves	5	**524**	582	1,039
Retained earnings	5	**35,916**	33,515	35,372
Total Equity		**53,953**	51,613	53,927
Non-Current Liabilities				
Provisions	6	**411**	-	396
Defined benefit plan	7(a)	**461**	1,217	508
Deferred tax liability	9(d)	**-**	-	-
Lease liability	10	**443**	183	183
Total non-current liabilities		**1,315**	1,400	1,087
Current Liabilities				
Trade and other payables	8	**15,724**	13,810	15,470
Provisions	6	**48**	30	30
Defined benefit plan	7(a)	**143**	123	110
Lease liability	10	**165**	142	141
Tax payable		**169**	-	19
Total current liabilities		**16,249**	14,105	15,770
Total equity and liabilities		**71,520**	67,118	70,784
Non-Current Assets				
Property, plant and equipment	11	**43,468**	54,385	45,696
Biological assets	12	**1,476**	1,391	1,374
Intangible assets	13	**839**	861	1,529
Investments	14	**85**	173	170
Right-of-use assets	10	**564**	139	270
Deferred tax asset	9(d)	**850**	393	261
Total non-current assets		**47,282**	57,342	49,300
Current Assets				
Cash and cash equivalents	16	**12,432**	1,802	12,727
Trade and other receivables	17	**11,397**	7,573	8,572
Inventories	18	**409**	401	185
Total current assets		**24,238**	9,776	21,484
Total Assets		**71,520**	67,118	70,784

The accompanying notes form part of these consolidated financial statements.

Signatures

Dr Helen Anderson QSO
Chair

Stana Pezic
Director

For and on behalf of the Board, who authorised the issue of these accounts on 13 September 2023.

CONSOLIDATED STATEMENT OF CASH FLOWS

FOR THE YEAR ENDED 30 JUNE 2023

	Note	ACTUAL 2023 $000	BUDGET (unaudited) 2023 $000	ACTUAL 2022 $000
Cash Received from Operating Activities				
Receipts from customers (excluding government grants)		**34,573**	20,612	32,774
Receipts from government grants		**27,354**	47,130	27,354
Interest received		**492**	120	81
		62,419	67,862	60,209
Cash disbursed on operating activities				
Payments to employees		**34,305**	36,247	32,033
Payments to suppliers		**24,260**	25,492	22,028
Interest paid		**12**	-	-
Income tax paid		**280**	-	1,460
		58,857	61,739	55,521
Net cash flows from Operating Activities	20	**3,562**	6,123	4,688
Cash Received from Investing Activities				
Disposal of property, plant and equipment		**-**	-	-
Government grant		**-**	-	-
Cash Disbursed on Investing Activities				
Investment in property, plant and equipment		**3,776**	14,000	6,567
Purchase of other investments and intangible assets		**(298)**	-	(107)
		3,478	14,000	6,460
Net cash flows used in Investing Activities		**(3,478)**	(14,000)	(6,460)
Cash Received from Financing Activities				
Term loan drawdown		**-**	-	-
Total cash received from financing activities		**-**	-	-
Cash Disbursed from Financing Activities				
Repayment of the lease liabilities		**379**	156	144
		379	156	144
Net cash flow from financing activities		**(379)**	(156)	(144)
Total net cash flow		**(295)**	(8,033)	(1,916)
Net Increase/(Decrease) in Cash Held		**(295)**	(8,033)	(1,916)
Add opening cash brought forward		**12,727**	9,835	14,643
Ending Cash Carried Forward	16	**12,432**	1,802	12,727

The statement of accounting policies and the accompanying notes form an integral part of these financial statements.

NOTES TO AND FORMING PART OF THE CONSOLIDATED FINANCIAL STATEMENTS
FOR THE YEAR ENDED 30 JUNE 2023

1. Statement of Accounting Policies

Reporting Entity

New Zealand Forest Research Institute Limited is a Crown Research Institute registered under the Companies Act 1993. The registered office is Te Papa Tipu Innovation Park, 49 Sala Street, Rotorua. The consolidated financial statements consist of New Zealand Forest Research Institute Limited and its subsidiaries (the Group). The consolidated financial statements of New Zealand Forest Research Institute Limited for the year were authorised for issue in accordance with a resolution of the Directors on the date as set out on the Consolidated Statement of Financial Position.

New Zealand Forest Research Institute Limited (the Company) is domiciled and incorporated in New Zealand and is wholly owned by the Crown.

The activities of New Zealand Forest Research Institute Limited include a range of research and development programmes aimed to drive innovation and growth from New Zealand's forestry, wood-derived materials and other biomaterial sectors to create economic value and contribute to beneficial environmental and social outcomes for New Zealand.

New Zealand Forest Research Institute Limited trades as Scion and these names have identical meaning in this report.

1.1 Summary of Significant Accounting Policies

a) Basis of Preparation

The consolidated financial statements have been prepared in accordance with generally accepted accounting practice in New Zealand (NZ GAAP) and the requirements of the Companies Act 1993, the Financial Reporting Act 2013, the Public Finance Act 1989, the Crown Entities Act 2004 and the Crown Research Institutes Act 1992. The consolidated financial statements have also been prepared on a historical cost basis, except for forestry assets, carbon credits and certain heritage assets that have been measured at fair value.

The consolidated financial statements are presented in New Zealand dollars and all values are rounded to the nearest thousand dollars ($000).

b) Statement of Compliance

The consolidated financial statements have been prepared in accordance with NZ GAAP. For the purpose of complying with NZ GAAP, the Group is a for profit entity. They comply with New Zealand equivalents to International Financial Reporting Standards (IFRS), and other applicable Financial Reporting Standards, as appropriate for profit-oriented entities. The consolidated financial statements comply with IFRS.

c) Basis of consolidation

The consolidated financial statements comprise the financial statements of the Company and its subsidiaries as at 30 June. Control is achieved when the Group is exposed, or has rights, to variable returns from its involvement with the investee and has the ability to affect those returns through its power over the investee. Specifically, the Group controls an investee if and only if the Group has:

- Power over the investee (i.e.existing rights that give it the current ability to direct the relevant activities of the investee);
- Exposure, or rights, to variable returns from its involvement with the investee; and
- The ability to use its power over the investee to affect its returns.

When the Group has less than a majority of the voting or similar rights of an investee, the Group considers all relevant facts and circumstances in assessing whether it has power over an investee, including:

- The contractual arrangement with the other vote holders of the investee;
- Rights arising from other contractual arrangements; and
- The Group's voting rights and potential voting rights.

The Group re-assesses whether or not it controls an investee if facts and circumstances indicate that there are changes to one or more of the three elements of control. Consolidation of a subsidiary begins when the Group obtains control over the subsidiary and ceases when the Group loses control of the subsidiary. Assets, liabilities, income and expenses of a subsidiary acquired or disposed of during the year are included in the statement of comprehensive income from the date the Group gains control until the date the Group ceases to control the subsidiary.

All intra-group assets and liabilities, equity, income, expenses and cash flows relating to transactions between members of the Group are eliminated in full on consolidation.

A change in the ownership interest of a subsidiary, without a loss of control, is accounted for as an equity transaction. If the Group loses control over a subsidiary, it:

- Derecognises the assets (including goodwill) and liabilities of the subsidiary;
- Derecognises the carrying amount of any non-controlling interests;
- Derecognises the cumulative translation differences recorded in equity;
- Recognises the fair value of the consideration received;
- Recognises the fair value of any investment retained;
- Recognises any surplus or deficit in profit or loss;
- Reclassifies the Group's share of components previously recognised in other consolidated income (OCI) to profit or loss or retained earnings, as appropriate, as would be required if the Group had directly disposed of the related assets or liabilities.

d) Associate companies

The Group's investment in its associates is accounted for using the equity method of accounting in the consolidated financial statements. The associates are entities over which the Group has significant influence and that are neither subsidiaries nor joint ventures.

The Group deems it has significant influence if it has over 20% of the voting rights.

The reporting dates of the associates and subsidiaries, and the Company, are identical, and the associates' accounting policies conform to those used by the Company for like transactions and events in similar circumstances.

Associate companies have been reflected in the consolidated financial statements on an equity accounting basis which shows the Group's share of profit in the Consolidated Statement of Comprehensive Income and its share of post-acquisition increases or decreases in net assets, in the Consolidated Statement of Financial Position.

The Group's investment in fair value through profit and loss is accounted for using the equity method of accounting in the consolidated financial statements. The investments in fair value through profit and loss are entities over which the Group has less than 20% of the voting rights and that are neither subsidiaries nor joint ventures.

e) Intangible assets

Intangible assets acquired separately are capitalised at cost and those acquired from a business combination are capitalised at fair value as at the date of acquisition. Following initial recognition, the cost model is applied to the class of intangible assets.

Research costs are not capitalised and expenditure is charged to profit and loss in the year in which the expenditure is incurred. Other intangible assets are capitalised where they meet the relevant criteria and include the purchase price and any directly attributable cost of preparing the asset for its intended use.

The useful lives of these intangible assets are assessed to be either finite or indefinite.

Where amortisation is charged on assets with finite lives, this expense is recognised in profit and loss.

Intangible assets are tested for impairment where an indicator of impairment exists, and in the case of indefinite life intangibles, annually, either individually or at the cash generating unit level. Useful lives are also examined on an annual basis and adjustments, where applicable, are made on a prospective basis.

Gains or losses arising from de-recognition of an intangible asset are measured as the difference between the net disposal proceeds and the carrying amount of the asset and are recognised in the profit and loss when derecognised.

Software. A summary of the policies applied to the Group's capitalised software is as follows:

	Software
Useful lives	Finite
Method used	Four years – straight-line
Type	Acquired
Impairment test/recoverable	Amortisation method reviewed at each financial year-end
Amount testing	Reviewed annually for indicators of impairment

Carbon credits. New Zealand emission reduction units (NZUs) are recognised when the Group controls the units, provided that it is probable that economic benefits will flow to the Group and the fair value of the units can be measured reliably. Control of the NZUs arises when the Group is entitled to claim the NZUs from the Government.

NZUs are initially measured at fair value on entitlement as an intangible asset unless the Board has determined they are held for sale, in which case they would be recorded at fair value as inventory.

Following initial recognition, the intangible asset is measured at fair value when the Board consider there is an active market for the sale of NZUs. NZUs determined as held for sale at recognition and recorded as inventory, are subsequently measured at the lower of cost and net realisable value.

he liability arising from the deforestation of eligible land is measured using the market value approach. A liability exists and is recognised on pre-1990 forests if the land use changes from forestry.

f) Biological assets

Biological assets consist entirely of tree plantations which are measured at fair value less any point of sale costs. Gains and losses arising on initial recognition or change in fair value, less estimated point of sale costs, are included in profit and loss in the period in which they arise.

The fair value of tree plantations is determined by an independent valuer.

The valuation method for immature trees is the net present value of future net harvest revenue less estimated costs of owning, protecting, tending and managing trees. For mature trees, fair value is deemed to be the net harvest revenue value.

g) Property, plant and equipment

All items of property, plant and equipment are initially recorded at cost, where relevant on purchase from the Crown as at 7 July 1992, adjusted for subsequent additions at cost, disposals, depreciation and impairment. Plant and equipment are recorded at cost less accumulated depreciation less accumulated impairment losses (if any). Land and capital work in progress are recorded at cost. Some library books have been identified as heritage assets and are recorded at fair value as determined by an independent valuer. Valuations are obtained every five years or more often where circumstances indicate that a significant change in fair value has occurred.

Expenditure incurred on property, plant and equipment is capitalised where such expenditure will increase or enhance the future benefits provided by the asset. Expenditure incurred to maintain future benefits is classified as repairs and maintenance.

When an item of property, plant and equipment is disposed of the difference between the net disposal proceeds and the carrying amount is recognised as a gain, or loss, in profit and loss.

Depreciation is provided for using the straight-line method to allocate the historical cost, less an estimated residual value, over the estimated useful life of the asset.

The useful lives of the major classes of assets have been calculated as follows:

Buildings and land improvements	20 – 60 years
Plant and equipment	3 – 20 years
Furniture and fittings	10 – 20 years
Motor vehicles	3 – 7 years
Library books and periodicals	20 years or longer

h) Recoverable amount of non-financial assets

At each reporting date, the Group assesses whether there is any indication a non-financial asset may be impaired. Where an indicator of impairment exists, the Group makes a formal estimate of recoverable amount. Where the carrying amount of an asset exceeds its recoverable amount the asset is considered impaired and is written down to its recoverable amount.

Recoverable amount is the greater of fair value less costs to sell and value in use. It is determined for an individual asset, however, if the asset's value in use cannot be estimated to be close to its fair value less costs to sell, and it does not generate cash inflows that are largely independent of those from other assets or Groups of assets, it is determined for the cash-generating unit to which the asset belongs.

In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

i) Trade receivables

Trade receivables are classified as financial assets at amortised costs. Trade receivables are initially recognised at fair value and subsequently valued at amortised cost less impairment allowance.

The Group applies a simplified approach in calculating expected credit losses (ECLs) for trade receivables, i.e. a loss allowance for trade receivables is based on lifetime ECLs at each reporting date. The Group has established a provision matrix that is based on its historical credit loss experience, adjusted for forward-looking factors specific to the debtors and the economic environment. The provision rates are based on days due for grouping of various customer segments with similar loss patterns. The calculation reflects the probability-weighted outcome, the time value of money and reasonable and supportable information that is available at the reporting date about past events, current conditions and forecasts of future economic conditions.

j) Inventories

Consumable stores are valued at the lower of cost, on a weighted average price of stock on hand, and net realisable value.

Nursery stocks are valued at lower of cost or net realisable value. Changes in net realisable value are recognised in the profit and loss account in the period in which they occur.

k) Research Costs

Research costs are expensed in the period incurred.

l) Provisions

Provisions are recognised when the Group has a present obligation (legal or constructive) as a result of a past event, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation.

Provisions are measured at the present value of management's best estimate of the expenditure required to settle the present obligation at the consolidated statement of financial position date using a discounted cash flow methodology.

m) Employee benefits

i. Wages, salaries and annual leave

The liability for wages, salaries and annual leave recognised in the Consolidated Statement of Financial Position is the amount expected to be paid at balance date. Provision has been made for benefits accruing to employees for annual leave in accordance with the provisions of employment contracts in place at balance date.

ii. Long service leave

The liability for long service leave (which includes service recognition leave) is recognised and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date using the projected unit credit method. Consideration is given to expected future wage and salary levels, experience of employee departures, and periods of service. Expected future payments are discounted using market yields at the reporting date on national government bonds with terms to maturity and currencies that match, as closely as possible, the estimated future cash outflows.

iii. Defined benefit plan

The defined benefit plan is unfunded. The cost of providing benefits under the defined benefit plan is determined using the projected unit credit actuarial valuation method. Actuarial gains and losses are recognised through other comprehensive income in the period in which they arise.

The defined benefit liability recognised in the Consolidated Statement of Financial Position represents the present value of the defined benefit obligations.

Long service leave and defined benefit plan provisions are based on an actuarial valuation.

n) Leases

The Group assesses at contract inception whether a contract is, or contains, a lease. That is, if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration.

Group as a lessee. The Group applies a single recognition and measurement approach for all leases, except for short-term leases and leases of low-value assets. The Group recognises lease liabilities to make lease payments and right-of-use assets representing the right to use the underlying assets.

i. Right-of-use assets

The Group recognises right-of-use assets at the commencement date of the lease (i.e., the date the underlying asset is available for use). Right-of-use assets are measured at cost, less any accumulated depreciation and impairment losses, and adjusted for any remeasurement of lease liabilities. The cost of right-of-use assets includes the amount of lease liabilities recognised, initial direct costs incurred, and lease payments made at or before the commencement date less any lease incentives received. Right-of-use assets are depreciated on a straight-line basis over the shorter of the lease term and the estimated useful lives of the assets, as follows:

Building	3–6 years
Forestry rights	70 years

ii. Lease liabilities

At the commencement date of the lease, the Group recognises lease liabilities measured at the present value of lease payments to be made over the lease term. The lease payments include fixed payments (including in-substance fixed payments) less any lease incentives receivable, variable lease payments that depend on an index or a rate, and amounts expected to be paid under residual value guarantees. The lease payments also include the exercise price of a purchase option reasonably certain to be exercised by the Group and payments of penalties for terminating the lease, if the lease term reflects the Group exercising the option to terminate.

Variable lease payments that do not depend on an index or a rate are recognised as expenses (unless they are incurred to produce inventories) in the period in which the event or condition that triggers the payment occurs.

In calculating the present value of lease payments, the Group uses its incremental borrowing rate at the lease commencement date because the interest rate implicit in the lease is not readily determinable. After the commencement date, the amount of lease liabilities is increased to reflect the accretion of interest and reduced for the lease payments made. In addition, the carrying amount of lease liabilities is remeasured if there is a modification, a change in the lease term, a change in the lease payments (e.g., changes to future payments resulting from a change in an index or rate used to determine such lease payments) or a change in the assessment of an option to purchase the underlying asset.

iii. Short-term leases and leases of low-value assets

The Group applies the short-term lease recognition exemption to its short-term leases of temporary buildings (i.e., those leases that have a lease term of 12 months or less from the commencement date and do not contain a purchase option). It also applies the lease of low-value assets recognition exemption to leases of office equipment that are considered to be low value. Lease payments on short-term leases and leases of low-value assets are recognised as an expense on a straight-line basis over the lease term.

Group as a lessor
Leases in which the Group retains substantially all the risks and benefits of ownership of the leased asset are classified as operating leases.

o) Cash and cash equivalents

Cash and cash equivalents in the Consolidated Statement of Financial Position comprise cash at bank and in-hand and short-term deposits with an original maturity of three months or less or greater than three months with no significant risk of a change in value from an early withdrawal.

For the purposes of the Consolidated Statement of Cash Flows, cash and cash equivalents consist of cash and cash equivalents as defined above, net of outstanding bank overdrafts.

p) Goods and services tax (GST)

All items in the financial statements are stated net of GST, with the exception of trade receivables and payables, which are inclusive of GST invoiced.

q) Foreign currencies

Functional and presentation currency. Both the functional and presentation currency of New Zealand Forest Research Institute Limited and its subsidiaries is New Zealand dollars.

Transactions and balances. Transactions in foreign currencies are initially recorded in the functional currency by applying the exchange rates ruling at the date of the transaction. Monetary assets and liabilities denominated in foreign currencies are retranslated at the rate of exchange ruling at the Consolidated Statement of Financial Position date.

Non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate as at the date of the initial transaction. Non-monetary items measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

r) Revenue recognition

Revenue from contracts with customers

Research revenue. Research revenue from both Government and commercial sources is recognised over time using an input method to measure progress toward complete satisfaction of the service, because the Group's performance does not create an asset with an alternative use and the Group has an enforceable right to payment for performance completed to date. Revenue is recognised by reference to costs incurred to date and other contracted commitments. Work completed but not invoiced is recorded as accrued revenue while work invoiced but not completed is recorded as revenue in advance.

Government revenue under research revenue includes non-devolved revenue received from the Ministry of Business, Innovation and Employment in the form of Endeavour Funding, and Preseed Accelerator Fund programmes.

Sale of goods and rendering services (fee for services). Revenue from work programmes under Commercial Testing Services and Nursery crops is recognised at the point of time when control is transferred to the customer, generally on dispatch of crops to the customer or when service is completed.

Other revenue

Government grants. Government grants includes devolved revenue from the Ministry of Business, Innovation and Employment in the form of Strategic Science Investment Funding and COVID-19 Response and Recovery Funding. Government grant revenue is only recognised after all appropriate conditions have been met.

Rent revenue. Rent revenue is recognised on a straight-line basis over the lease term.

Interest revenue. Interest revenue is recognised when earned based on applicable interest rates applied to the Group's cash deposit balances.

s) Taxation

The income tax expense charged to the profit and loss includes both the current year's provision and the income tax effects of temporary differences calculated using the liability method. Current income tax relating to items recognised directly in equity is recognised in equity and not in profit or loss.

Tax effect accounting is applied on a comprehensive basis to all temporary differences. A debit balance in the deferred tax account, arising from temporary differences or income tax benefits from income tax losses, is only recognised if it is probable there will be taxable profits available in the future against which the deferred tax asset can be utilised.

Subsequent realisation of the tax benefit is subject to the requirements of income tax legislation being met.

Trade and other payables

Trade and other payables are classified as financial liabilities at amortised costs. They are carried at amortised cost and due to their short-term nature they are not discounted. They represent liabilities for goods and services provided to the Group prior to the end of the financial year that are unpaid and arise when the Group becomes obliged to make future payments in respect of the purchase of these goods and services. The amounts are unsecured and are usually paid within 60 days of recognition.

1.2 Significant account judgements, estimates and assumptions

a) Revenue recognition from contracts with customer

Revenue is predominately recognised based on the percentage of work completed on a project basis over time. Percentage of work completed is based on costs incurred from inception of the project as a percentage of total forecasted project costs. Management judgement is required in estimating total forecasted costs which impacts the revenue recognised (Note 2), the revenue in advance (Note 8) and accrued revenue (Note 17).

In determining if a customer contract can be recognised over time, management have considered their right to receive payment for work done up to the point of any termination of contract. In the absence of a termination clause management has assessed that the Group has a clear right to be paid for work completed up to the point of termination.

b) Heritage assets

The Group holds several heritage assets which have significant value due to being both rare, and having importance to the nation. Where a heritage cost can be measured reliably they are revalued at least every five years and included as part of property plant and equipment.

The increase/decrease in value is recognised in the Consolidated Statement of Financial Position through other comprehensive income.

Due to the nature of some heritage assets, management does not believe they can be valued reliably. These assets have been identified and disclosed. Details of heritage assets can be found in Note 11 and 22.

c) Biological assets

The Group's biological assets consist of tree plantations. These are valued at the net present value of future net harvest revenue less estimated costs of owning, protecting, tending and managing trees. The valuation process includes several judgements and estimations around discount rates, future costs, and future prices. Management used the experience of a registered forestry valuer to reduce the risk of misstatement resulting from these judgements and estimates.

1.3 Accounting standards issued but not yet effective

The following standards that have been issued but not yet effective and have not been earlier adopted by the Group and may have an impact on the Group's financial statements:

NZ IAS 1 Classification of Liabilities as Current or Non-current	Date Applicable for Scion 1 July 2023

The impact of the above standard is not known to the Group.

1.3 Accounting standards issued but not yet effective

There are no new accounting standards or amendments adopted this financial year.

2. Revenue and Other Income

	ACTUAL 2023 $000	ACTUAL 2022 $000
(a) Revenue		
Revenue from research contracts		
Ministry of Business, Innovation and Employment revenue	**17,516**	12,955
Other Government and Crown Research Institute revenue	**8,861**	9,355
Commercial research revenue	**12,553**	11,384
	38,930	33,694
Government grants		
Strategic Science Investment Fund	**23,786**	23,786
COVID-19 Response and Recovery Fund	**-**	-
	23,786	23,786
Other Revenue		
Commercial lease revenue	**1,096**	1,036
Interest revenue	**491**	145
Other revenue	**18**	55
	1,605	1,236
Total Revenue	**64,321**	58,716
(b) Other Income/(Expenditure)		
Change in fair value of plantation trees	**102**	(17)
Revaluation of non-controlling interests	**(85)**	30
	17	13

3. Expenditure and Finance Costs

	ACTUAL 2023 $000	ACTUAL 2022 $000
(a) Expenditure		
Personnel remuneration and expenses	**33,652**	31,196
Other personnel related costs	**887**	767
Contractors and subcontractors	**16,705**	14,536
Consumables	**1,154**	1,645
Travel and accommodation	**1,718**	711
Rental and equipment hire costs	**163**	153
Depreciation on leases	**152**	134
Depreciation	**5,763**	5,665
Amortisation	**32**	26
(Gain)/loss on disposal of fixed assets	**(383)**	6
Impairment of assets	**-**	-
Premises	**2,832**	2,467
Directors' fees	**220**	195
Other	**742**	644
	63,637	58,145
(b) Finance Costs		
IRD use of money interest		-
Lease interest	**12**	16
	12	16

4. Auditor's Remuneration

	ACTUAL 2023 $000	ACTUAL 2022 $000
Amounts paid or due and payable to the auditors for:		
Auditing financial statements		
Parent entity auditor	**181**	165
	181	165

5. Equity

New Zealand Forest Research Institute Limited has authorised, issued and paid up capital of 17,516,000 (2022: 17,516,000) ordinary shares. Shares do not have a par value.

All shares have equal rights with respect to voting, dividends and distribution on winding up. There are no restrictions on the distribution of dividends or repayment of capital.

No dividends were declared or paid to shareholders during the year (2022: $0).

The Asset Revaluation and Pension Reserve is used to record increments and decrements in the fair value of heritage assets, fair value movement in revaluation of carbon units and remeasurement of defined benefit plan liabilities. Movements in the asset revaluation and pension reserve are not reclassified to the profit and loss in subsequent periods.

Capital Management

Scion is 100% Crown owned. Scion completes a five-year plan on an annual basis and as part of that five-year plan, any capital requirements for the future are identified. When managing capital, management's objective is to ensure the entity continues as a going concern while balancing its financial goals of delivering returns in line with market cost of capital, with its public good goals of reinvesting in science that will benefit New Zealand. Management uses total equity as capital. The Group has no externally imposed capital requirements.

6. Provisions

The Group has provisions for long service leave and restructuring. The long service leave provision was actuarially valued by Aon Hewitt Consulting, an independent risk management and consulting organisation.

The provisions are made up as follows:

	ACTUAL 2023 $000	ACTUAL 2022 $000
Current Provision	**48**	30
Non-Current Provision	**411**	396
	459	426

Movement in each class of provision during the year is as follows:

	Long Service Leave 2023 $000	Restructuring 2023 $000	TOTAL 2023 $000	Long Service Leave 2022 $000	Restructuring 2022 $000	TOTAL 2022 $000
Balance 1 July	**426**	**-**	**426**	497	35	532
Provision reversed during the year	**-**	**-**	**-**	0	0	0
Amounts used during the year	**(61)**	**-**	**(61)**	(72)	(107)	(179)
Provisions made during the year	**94**	**-**	**94**	1	72	73
Balance 30 June	**459**	**-**	**459**	426	0	426

7. Pension Plans

a) Defined Benefit Plan

Scion operates an unfunded final salary defined benefit plan. The level of benefits provided depends on the member's length of service and salary at retirement age. The plan is closed to new members and will cease when the current members have either retired or left the Group. There are no assets backing the unfunded liability.

The cost of providing benefits under the defined benefit plan is determined using the projected unit credit actuarial valuation method. Actuarial gains and losses are recognised in Statement of Other Comprehensive Income. Past service cost is recognised immediately in profit or loss.

The defined benefit liability recognised in the Consolidated Statement of Financial Position represents the present value of the defined benefit obligations.

	ACTUAL 2023 $000	ACTUAL 2022 $000
Net plan expense		
Current service cost	**16**	17
Interest cost on benefit obligation	**25**	21
Net actuarial gains recognised in the year	**(8)**	(55)
Net plan expense/(income)	**33**	(17)

The net plan expense is included in the Personnel remuneration and expense line in Note 3(a) Expenditure.

	Defined Benefit Plan				
Benefit liability included in the Consolidated Statement of Financial Position	**2023 $000**	**2022 $000**	**2021 $000**	**2020 $000**	**2019 $000**
Present value of defined benefit obligation	**604**	618	670	819	838

Changes in the present value of the defined benefit obligation are as follows:

	ACTUAL 2023 $000	ACTUAL 2022 $000
Opening balance	**618**	670
Current service cost	**16**	17
Interest cost	**25**	21
Actuarial gains recognised in the year	**(8)**	(55)
Benefits paid	**(47)**	(35)
Closing balance	**604**	618
Current provision	**143**	110
Non-current provision	**431**	508
	604	618

The history of experience adjustments is as follows:

	2023 $000	**2022 $000**	**2021 $000**	**2020 $000**	**2019 $000**
Experience adjustments on plan liabilities	**11**	(10)	(27)	(20)	(6)

7. Pension Plans (cont.)

a) Defined Benefit Plan (cont.)

The principal actuarial assumptions used in determining the defined benefit plan obligations are shown below:

	Actual 2023	Actual 2022
10yr discount rate	**4.65%**	4.02%
Future salary increases	**2.20%**	2.00%

At 30 June a change in the assumed rates of salary growth and resignation rates, all other assumptions remaining unchanged, would affect the balance of the liability as follows:

	ACTUAL 2023 $000	ACTUAL 2022 $000
Current obligation	**604**	618
Salary growth		
Reduction of 1% per annum	**583**	594
Increase of 1% per annum	**626**	644
Resignation rates		
150% of assumed rates	**604**	618
50% of assumed rates	**604**	618

Interest rate assumptions are based on Treasury's published risk-free discount rates.

b) Defined Contribution Plan

During the period defined contributions totalling $880k (2022: $792k) were made to the Government Superannuation Fund and KiwiSaver.

	ACTUAL 2023 $000	ACTUAL 2022 $000
8. Trade and Other Liabilities		
Trade payables	**3,588**	3,996
Employee payables and accruals	**3,348**	3,137
Revenue in advance	**8,788**	8,337
	15,724	15,470

The carrying amount disclosed above is a reasonable approximation of fair value. Trade creditors are non-interest bearing and are normally settled within 60 days.

Revenue in advance includes advances received to 30 June each year. Total revenue recognised during the year that was in Revenue in Advance at the start of the year totals $6.4m (2022: $6.4m).

		ACTUAL 2023 $000	ACTUAL 2022 $000
9.	**Income Tax**		
	(a) Income Tax Expense		
	The major components of income tax expense in the Consolidated Statement of Comprehensive Income are:		
	Current income tax		
	Current income tax charge	**500**	409
	Adjustments to prior year current income tax change	**45**	228
		545	637
	Deferred income tax		
	Deferred tax expenses/(income) related to prior year	**(37)**	47
	Relating to origination and reversal of temporary differences	**(369)**	(597)
	Impact of changes to building depreciation	**-**	-
		(406)	(550)
	Income tax expense/(income) reported in the Consolidated Statement of Comprehensive Income	**139**	87
	(b) Amounts charged or credited directly to other comprehensive income		
	Deferred income tax related to items charged (credited) directly to other comprehensive income		
	Net gain on revaluation of heritage assets		-
	Remeasurement of gain/loss on defined benefit plan	**(2)**	(31)
	Revaluation of carbon credits	**(181)**	335
	Deferred tax charged to OCI	**(183)**	304
	(c) Reconciliation between the aggregate tax expense recognised in the Consolidated Statement of Comprehensive Income to tax expense calculated at the statutory income tax rate		
	Accounting profit before income tax	**683**	510
	Tax at the statutory income tax rate of 28% (2022: 28%)	**191**	143
	Adjusted by:		
	Prior year income tax	**8**	271
	Entertainment	**10**	5
	Impact of changes to building depreciation	**-**	-
	Other	**(70)**	(332)
	Income tax expense	**139**	87
	(d) Deferred income tax relates to the following:		
	Deferred tax liabilities		
	Property, plant and equipment	**278**	(99)
	Leases	**12**	15
	Nursery inventory	**-**	(38)
	Standing timber	**(413)**	(389)
	Carbon Credits	**(200)**	(381)
		(323)	(892)
	Deferred tax assets		
	Patents and trademarks	**111**	171
	Payroll provisions	**878**	749
	Allowance for impairment loss	**19**	8
	Other	**165**	225
		1,173	1,153
	Net Deferred Tax Asset/(Liability) per Consolidated Statement of Financial Position	**850**	261

The Group has no unused tax losses (2022: $0k)

10. Leases

Group as a Lessee

The Group has lease contracts for buildings in Christchurch and Wellington plus Forestry rights in Puruki. The building leases are for terms of 3 to 6 years with the Forestry rights being for a period of 70 years. The Group obligations under its leases are secured by the lessor's title to the leased assets. Generally, the Group is restricted from assigning and subleasing the leased assets. The lease contracts include extension and termination options.

Set out below are the carrying amounts of right-of-use assets recognised and the movement during the period:

	Building $000	Forestry Rights $000	Total $000
As at 1 July 2021	304	104	408
Additions	(4)	-	(4)
Depreciation expense	(132)	(2)	(134)
As at 30 June 2022	168	102	270
Additions	446	-	446
Depreciation expense	(150)	(2)	(152)
As at 30 June 2023	**464**	**100**	**564**

Set out below are the carrying amounts of lease liabilities and the movements during the period:

	ACTUAL 2023 $000	ACTUAL 2022 $000
As at 1 July	**324**	468
Additions	**436**	0
Realignment of lease end date	**-**	(10)
Accretion of interest	**12**	16
Payments	**(164)**	(150)
As at 30 June	**608**	324
Current	**165**	141
Non-Current	**443**	183
The following are the amounts recognised in profit or loss:		
Depreciation expense of right-of-use assets	**152**	134
Interest expense on lease liabilities	**12**	16
Variable lease payments (included in Other Expenditure)	**36**	23
Total Amount recognised in profit or loss	**200**	173

The Group had total cash outflow for leases of $343k in 2023 (2022: $238k).

11. Property, Plant and Equipment

GROUP	Land & Improvements	Buildings	Plant & Equipment	Furniture & Fittings	Motor Vehicles	Books & Periodicals	Capital Work in Progress	Total
	0	$000	$000	$000	$000	$000	$000	$000
At 1 July 2022								
Carrying amount net of accumulated depreciation and impairment at 1 July 2022	1,394	18,097	14,188	5,889	470	100	5,568	45,696
Additions	-	-	61	-	5	-	3,597	3,663
Transfers from CWIP	-	-	2,984	16	26	-	(3,061)	(35)
Disposals	-	-	(2)	-	-	-	(91)	(93)
Impairment provision	-	-	-	-	-	-	-	-
Depreciated expensed	(48)	(644)	(4,104)	(824)	(143)	-	-	(5,763)
Carrying amount net of accumulated depreciation and impairment at 30 June 2023	1,346	17,453	13,127	5,081	358	100	6,003	43,468
At 30 June 2023								
Cost or fair value	2,244	31,827	61,443	9,165	1,266	106	6,003	112,054
Accumulated depreciation and impairment	(899)	(14,374)	(48,314)	(4,085)	(908)	(6)	-	(68,586)
Net carrying amount	1,345	17,453	13,129	5,080	358	100	6,003	43,468
At 1 July 2021								
Carrying amount net of accumulated depreciation and impairment at 1 July 2021	1,442	18,658	14,519	6,507	441	101	3,128	44,796
Additions	-	(6)	56	(104)	91	-	6,557	6,594
Transfers from CWIP	-	116	3,616	302	93	-	(4,126)	-
Disposals	-	-	(2)	-	(26)	-	-	(28)
Impairment provision	-	-	-	-	-	-	-	-
Depreciated expensed	(48)	(671)	(4,000)	(816)	(129)	(1)	-	(5,665)
Carrying amount net of accumulated depreciation and impairment at 30 June 2022	1,394	18,097	14,188	5,889	470	100	5,558	45,696
At 30 June 2022								
Cost or fair value	2,244	31,827	58,453	9,150	1,234	106	5,558	108,572
Accumulated depreciation and impairment	(850)	(13,730)	(44,265)	(3,261)	(764)	(6)	-	(62,876)
Net carrying amount	1,394	18,097	14,188	5,889	470	100	5,568	45,696

Books and periodicals include some library books classified as Heritage Assets. The Group engaged Rowan Gibbs, an antiquarian bookseller of 37 years' experience of Smith's Bookshop Limited to determine the fair value of the heritage library books as at 30 June 2019. These assets are level 3 in the fair value hierarchy. Refer to Note 22 regarding other heritage assets.

12. Biological Assets

Biological assets consist of tree plantations. The Group has 65.5 hectares of trees planted initially for experimental purposes. When experiments are completed, they are classified as biological assets. Trees will be harvested when they reach maturity.

	ACTUAL 2023 $000	ACTUAL 2022 $000
Carrying amount 1 July	**1,374**	1,391
Sale of Trees	**-**	-
(Loss)/Gain from changes in fair value less estimated point-of-sale costs	**102**	(17)
Carrying amount 30 June	**1,476**	1,374

The above biological assets are level 3 in the fair value hierarchy.

The Group has tree plantations at two locations:

a) 31 hectares of immature Radiata Pine is located at Puruki. The trees were planted for experimental purposes. The Group has a forestry right which expires in 2067.

b) 34.5 hectares of immature Radiata Pine is located at Mamaku plus 2.2 hectares of mature Sitka Spruce. The trees were planted for experimental purposes. The Group has a forestry right which terminates when the trees are harvested or in 2024, whichever is the earlier.

The tree plantations were valued as at 20 June 2023 by PF Olsen Limited, an independent forestry management and consultancy company.

The valuation method for immature trees is the net present value of future net harvest revenue less estimated costs of owning, protecting, tending and managing trees. For mature trees fair value is deemed to be the net harvest revenue value.

Fair value is sensitive primarily to log prices. Significant increase (decreases) in log prices would result in a significantly higher (lower) fair value.

13. Intangible Assets

	ACTUAL 2023 $000	ACTUAL 2022 $000
Software		
Opening balance 1 July		
At cost	**2,356**	2,348
Less accumulated amortisation	**(2,311)**	(2,285)
Opening net carrying amount 1 July	**45**	63
Opening carrying amount 1 July	**45**	63
Additions	**45**	8
Disposals	**-**	-
Current year amortisation	**(31)**	(26)
Amortisation write back	**-**	-
Closing carrying amount 30 June	**59**	45
Closing balance 30 June		
At cost	**2,401**	2,356
Less accumulated amortisation	**(2,342)**	(2,311)
Closing net carrying amount 30 June	**59**	45
Carbon Credits		
Carrying amount 1 July	**1,484**	852
Increase/(Decrease) in fair value	**(704)**	632
Carrying amount 30 June	**780**	1,484
Total intangible assets 30 June	**839**	1,529

14. Investments

	Shares	Percentage Held 2023	Percentage Held 2022	Balance Date
Subsidiaries				
Te Papa Tipu Properties Limited	100	100%	100%	30 June
Sala Street Holdings Limited	100	100%	100%	30 June

Te Papa Tipu Properties Limited was incorporated on 25 March 2004. The company owns the Group's land assets.
Sala Street Holdings Limited was incorporated on 9 November 2015. The company holds the Group's 50% investment in Scion Terax technologies.

All subsidiaries are incorporated in New Zealand.

	Shares	Percentage Held 2023	Percentage Held 2022
Investments in fair value through profit and loss			
Bipolymer Network Limited	150	15%	15%
Kiwi Innovations Network Limited	18	7%	7%
WQI Limited (in liquidation)	12,500	5%	5%

	ACTUAL 2023 $000	ACTUAL 2022 $000
Investments in fair value through profit and loss	85	170
Net Asset Valuation	85	170

15. Non-current assets available for sale

The Group was allocated a whole "Class B" internet address range in the early 1980's with the advent of the internet. The allocation resulted in approximately 65,000 IPv4 IP addresses. These addresses have been recorded with a nil cost and therefore have not been added onto the balance sheet as per the Intangible Assets accounting policy. This financial year, the Group sold a small portion of these shares and intends to sell the remaining IP addresses next financial year. At this point, the sale will be recorded directly through the profit and loss as a gain and disposal of non-current asset.

	ACTUAL 2023 $000	ACTUAL 2022 $000
16. Cash and Cash Equivalents	-	6
Cash on hand	7	1
Bank	6,180	8,110
Call deposits	6,245	4,610
Short-term deposits	12,432	12,727

		ACTUAL 2023 $000	ACTUAL 2022 $000
17.	**Trade and Other Receivables and Accrued Revenue**		
	Trade receivables	**4,960**	5,662
	Allowance for impairment loss	**(68)**	(28)
	Other debtors	**88**	88
	Prepayments	**1,345**	1,258
	Accrued revenue	**5,072**	1,581
	Related party receivables:		
	Investments in fair value through profit and loss	**3**	11
	Carrying amount 30 June	**11,400**	8,572

(a) The carrying amount of trade and other receivables disclosed above is a reasonable approximation of fair value due to the short-term nature of the receivables.

(b) Accrued revenue is initially recognised for revenue earned from research projects as receipt of consideration is conditional on successful completion of projects. Upon completion of the project, the amounts recognised as accrued revenue are reclassified to trade receivables.

(c) Trade receivables are non-interest bearing and are generally on 30–60-day terms.

At 30 June, the ageing analysis of trade receivables is as follows:

	Total $000s	0-30 Days CNI* $000s	0-30 Days CI* $000s	31-60 Days CNI* $000s	31-60 Days CI* $000s	61-90 Days PDNI* $000s	61-90 Days CI* $000s	+91 Days PDNI* $000s	+91 Days CI* $000s
2023	**4,960**	**4,700**	**-**	**182**	**-**	**-**	**-**	**10**	**68**
2022	5,663	5,466	-	157	-	-	-	12	28

* Current not impaired (CNI)

* Past due not impaired (PDNI)

* Considered impaired (CI)

(d) For related party terms and conditions refer to Note 24.

		ACTUAL 2023 $000	ACTUAL 2022 $000
18.	**Inventories**		
	Consumable stores (at cost)	**32**	50
	Nursery stock	**377**	135
	Closing carrying amount	**409**	185

Consumable stores recognised as an expense for the year are $62k (2022: $79k). The expense has been included in the “consumables” line item in Note 3 (a). Consumable inventory write-down in the period was $0k (2022: $0k).

Nursery stock recognised as an expense during the year was $260k(2022: $940k)

19. Financial Instruments

Financial Instruments include:

Financial Assets at amortised costs

Cash and cash equivalents
Trade receivables
Other debtors
Related party receivables

Financial Liabilities at amortised costs

Trade payables
Other payables
Related party payables

All the above financial instruments are measured at amortised cost. Due to their short-term nature their carrying amount is a reasonable approximation of their fair value.

Management have not identified any concentrations of risk for any of the below risk categories.

Liquidity Risk

The Group's objective is to maintain a balance between continuity of funding and flexibility through the use of a bank debt facility and a bank overdraft. Management monitors, on a monthly basis, our free capacity within the debt facility and our forecasted ability to pay for that debt.

All trade payables are non-interest bearing and are normally settled within 60 days. Other than lease liability which extends up to 46 years remaining, the Group liabilities all have contractual maturities of less than 120 days.

Credit Risk

Financial instruments that potentially subject the Group to credit risk consist of bank balances and accounts receivable. The Group generally does not require any security.

Significant new non-Government customers are credit checked. Trade receivable ageing is reviewed monthly and all aged trade receivables are followed up. Credit stops are used for non-paying customers.

Maximum exposures to credit risk as at balance date are:

	ACTUAL 2023 $000	ACTUAL 2022 $000
Current account	**7**	1
Call and short-term deposits	**12,425**	12,719
Trade receivables	**4,892**	5,633
Other debtors	**88**	88
Related party receivables	**-**	11

The above maximum exposures are net of any provision for impairment on these financial instruments.

Market Risk

Market risk on financial instruments comprise the following three types of risk:

Interest Rate Risk

The Group's exposure to market interest rates relates primarily to cash deposits.

	ACTUAL 2023 $000	ACTUAL 2022 $000
Cash in hand	**-**	6
Current account	**7**	1
Call deposits	**6,180**	8,109
Short-term deposits	**6,245**	4,610
	12,432	12,726

The current account is managed at low levels and interest returns on the current account are not material. Cash funds in excess of our current requirements are invested in short-term bank deposits to attract improved interest returns. At 30 June bank call and short-term deposits were earning variable interest at rates (2022: variable).

At 30 June 2023, if interest rates moved as indicated in the table below, with all other variables being held constant, post-tax profit and equity would have been affected as follows:

	2023 Change in Interest Rate	2023 Effect on Post Tax Profit & Equity $000	2022 Change in Interest Rate	2022 Effect on Post Tax Profit & Equity $000
Judgement of reasonably possible movements in interest rates	1%	90	1%	92
	-1%	(90)	-1%	(92)

Currency Risk

Only small cash balances are held in currencies other than New Zealand dollars. There is limited exposure to trade receivables and payables. Collection and payment on all these balances are expected within 30 days resulting in minimal foreign exchange risk.

Other Price Risk

Other price risk primarily relates to the market price of financial instruments. As Scion does not trade in financial instruments there is no perceived risk in this category.

		ACTUAL 2023 $000	ACTUAL 2022 $000
20.	**Reconciliation of operating profit after taxation with cash flows from operating activities**		
	Reported profit/(loss) after taxation	**544**	423
	Add/(less) non-cash items:		
	Depreciation	**5,915**	5,667
	Amortisation	**31**	26
	Movement on employee provision	**(26)**	-
	Provision for doubtful debts	**-**	-
	Movement on lease liability	**-**	-
	Movement in deferred tax	**(287)**	(144)
		5,633	5,261
	Add/(less) items classified as investing activity:		
	(Gain)/loss on disposal of property, plant and equipment	**-**	6
	Share in associate company (profit)/loss	**-**	58
	Capital related items in creditors	**-**	-
	Fair value movement in biological assets	**(17)**	(13)
		(17)	51
	Movements in working capital items:		
	(Increase)/Decrease in debtors and prepayments	**(2,823)**	(441)
	(Increase)/Decrease in inventories	**(225)**	151
	Increase/(Decrease) in creditors and accruals	**304**	471
	Increase/(Decrease) in taxation payable	**146**	(1,228)
		(2,598)	(1,047)
	Net cash flows from operating activities	**3,652**	4,688

21. Contingencies

Treaty of Waitangi Issues

Two verified land claims affecting the Group currently exist:

(i) Ngati Whakaue – covering the whole Rotorua Campus

(ii) Ngati Wahiao – covering the southern end of the Rotorua Campus

No reliable estimates can be made of the impact of these contingencies.

22. Heritage Assets

The Company has identified its library, herbarium and germplasm collections as heritage assets. For the herbarium and germplasm collections the Directors believe that there is no practical basis upon which to reliably value these collections. For the books and periodicals within the library refer to Note 11.

23. Commitments

Operating Lease – Group as Lessor:

The Group has entered into commercial property leases for buildings and land. These non-cancellable leases have remaining terms including rights to renew of up to 5 years on buildings and 13 years on land leases, with rights to renew for further 40 years. All leases include a clause to enable upward revision of the rental charge at a specified review date of between one and five years according to prevailing market conditions.

Future minimum rentals receivable under non-cancellable operating leases as at 30 June are as follows:

	ACTUAL 2023 $000	ACTUAL 2022 $000
Year one	**581**	431
Year two	**393**	303
Year three	**244**	303
Year four	**219**	185
Year five	**153**	154
Greater than five years	**1,190**	1,280
	2,780	2,656

Capital Commitments		
Capital expenditure contracted for at balance date but not provided for	**6,072**	2,661

24. Transactions with Related Parties

(a) Group

New Zealand Forest Research Institute Limited is wholly owned by the New Zealand Government (the ultimate parent). All transactions with the Government, government departments and agencies and government entities are conducted on normal terms between government agencies. Government Endeavour Funding, Strategic Science Investment Funding and Preseed Accelerator funding from the Ministry of Business, Innovation and Employment comprises of 65% of research revenue earned by Scion and is disclosed in Note 2 (a).

	ACTUAL 2023 $000	ACTUAL 2022 $000
(b) Investments in fair value through profit and loss		
Biopolymer Network Ltd		
Supplied goods and services	**-**	-
Receivable at balance date	**3**	10

(c) Other

The Group has transactions with other parties that are related by virtue of the relationship Scion Directors have with that other party, but these relationships do not alter the nature and amount of those transactions. These relationships and transactions are summarised below where annual transactions with a given related party in either FY23 or FY22 are greater than $100k.

Dr Jon Ryder, the Deputy Chair of New Zealand Forest Research Institute Limited, is CEO of Oji Fibre Solutions.

i) Oji Fibre Solutions

Scion provided services during the period totalling $180k (2022: $450k) and received services totalling $5k (2022: $5k). The amount receivable at year end was $22k (2022 $28k).

Terms and conditions of transactions with related parties

Outstanding balances at year end are unsecured and interest free. No guarantees are provided or received for any related party receivables or payables.

No related party debts were written off during the year (2022: $0k) and no impairment allowance has been raised for any of these debts.

	ACTUAL 2023 $000	ACTUAL 2022 $000
(d) Key Management Personnel		
Short term employee benefits	**1,939**	1,973
KiwiSaver employee benefits	**53**	53
	1,992	2,026

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INDEPENDENT AUDITOR'S REPORT TO THE READERS OF NEW ZEALAND FOREST RESEARCH INSTITUTE LIMITED'S GROUP FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2023

The Auditor-General is the auditor of New Zealand Forest Research Limited Group (the Group). The Auditor-General has appointed me, Simon Brotherton, using the staff and resources of Ernst & Young, to carry out the audit of the consolidated financial statements of the Group on his behalf.

Opinion

We have audited the consolidated financial statements of the Group on pages 45 to 68, that comprise the consolidated statement of financial position as at 30 June 2023, the consolidated statement of comprehensive income, consolidated statement of changes in equity and consolidated statement of cash flows for the year ended on that date and the notes to the consolidated financial statements that include accounting policies and other explanatory information.

In our opinion, the financial statements of the Group:

- present fairly, in all material respects:
  - its consolidated financial position as at 30 June 2023; and
  - its consolidated financial performance and cash flows for the year then ended; and
- comply with generally accepted accounting practice in New Zealand in accordance with New Zealand Equivalents to International Financial Reporting Standards and International Financial Reporting Standards.

Our audit was completed on 13 September 2023. This is the date at which our opinion is expressed.

The basis for our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities relating to the consolidated financial statements, we comment on other information, and we explain our independence.

Basis for our opinion

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the Professional and Ethical Standards and the International Standards on Auditing (New Zealand) issued by the New Zealand Auditing and Assurance Standards Board. Our responsibilities under those standards are further described in the Responsibilities of the auditor section of our report.

We have fulfilled our responsibilities in accordance with the Auditor-General's Auditing Standards.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of the Board of Directors for the consolidated financial statements

The Board of Directors is responsible on behalf of the Group for preparing consolidated financial statements that are fairly presented and that comply with generally accepted accounting practice in New Zealand.

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The Board of Directors is responsible for such internal control as it determines is necessary to enable it to prepare consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the Board of Directors is responsible on behalf of the Group for assessing the Group's ability to continue as a going concern. The Board of Directors is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting, unless the Board of Directors has to cease operations, or has no realistic alternative but to do so.

The Board of Directors' responsibilities arise from the Crown Research Institutes Act 1992.

Responsibilities of the auditor for the audit of the consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements, as a whole, are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but it is not a guarantee that an audit carried out in accordance with the Auditor-General's Auditing Standards will always detect a material misstatement when it exists. Misstatements are differences or omissions of amounts or disclosures and can arise from fraud or error. Misstatements are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of readers taken on the basis of these consolidated financial statements.

For the budget information reported in the consolidated financial statements, our procedures were limited to checking that the information agreed to the Group's budget.

We did not evaluate the security and controls over the electronic publication of the consolidated financial statements.

As part of an audit in accordance with the Auditor-General's Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. Also:

- We identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- We obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.
- We evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors.
- We conclude on the appropriateness of the use of the going concern basis of accounting by the Board of Directors and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

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- We evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- We obtain sufficient appropriate audit evidence regarding the consolidated financial statements of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

We communicate with the Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Our responsibilities arise from the Public Audit Act 2001.

Other Information

The Board of Directors is responsible for the other information. The other information comprises the information in the Annual Report other than the consolidated financial statements on pages 45 to 68, and our auditor's report thereon on pages 69 to 71.

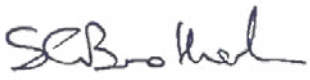
Our opinion on the consolidated financial statements does not cover the other information and we do not express any form of audit opinion or assurance conclusion thereon.

In connection with our audit of the consolidated financial statements, our responsibility is to read the other information. In doing so, we consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on our work, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Independence

We are independent of the Group in accordance with the independence requirements of the Auditor-General's Auditing Standards, which incorporate the independence requirements of Professional and Ethical Standard 1: *International Code of Ethics for Assurance Practitioners* issued by the New Zealand Auditing and Assurance Standards Board.

Other than the audit, we have no relationship with, or interests in, the Group.



Simon Brotherton
Ernst & Young
On behalf of the Auditor-General
Auckland, New Zealand

Directory

Directors	Dr Helen Anderson QSO (Chair)
	Dr Jon Ryder (Deputy Chair)
	Mr Brendon Green
	Mr Greg Mann
	Ms Stana Pezic
	Mr Steve Wilson
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Executive Management	Dr Julian Elder Chief Executive
	Dr Henri Baillères General Manager, Forests to Timber Products
	Dr Roger Dungan General Manager. Strategic Partnerships and Communications
	Dr Florian Graichen General Manager, Forests to Biobased Products
	Mr Cameron Lucich General Manager, People, Culture and Safety
	Mr Hēmi Rolleston General Manager, Te Ao Māori and Science Services
	Dr Tara Strand General Manager, Forests and Landscapes
	Ms Justine Wilmoth General Manager, Finance and Corporate Services
Bankers	ANZ Bank of New Zealand Limited
Auditors	Ernst & Young, Auckland on behalf of the Auditor-General
Solicitors	Bell Gully, Auckland

Science New Zealand

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The Crown Research Institutes (CRIs) proudly work, individually and collectively, to create a more prosperous, sustainable and innovative Aotearoa New Zealand.

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Manaaki Whenua
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40
NATIONALLY SIGNIFICANT DATABASES & COLLECTIONS

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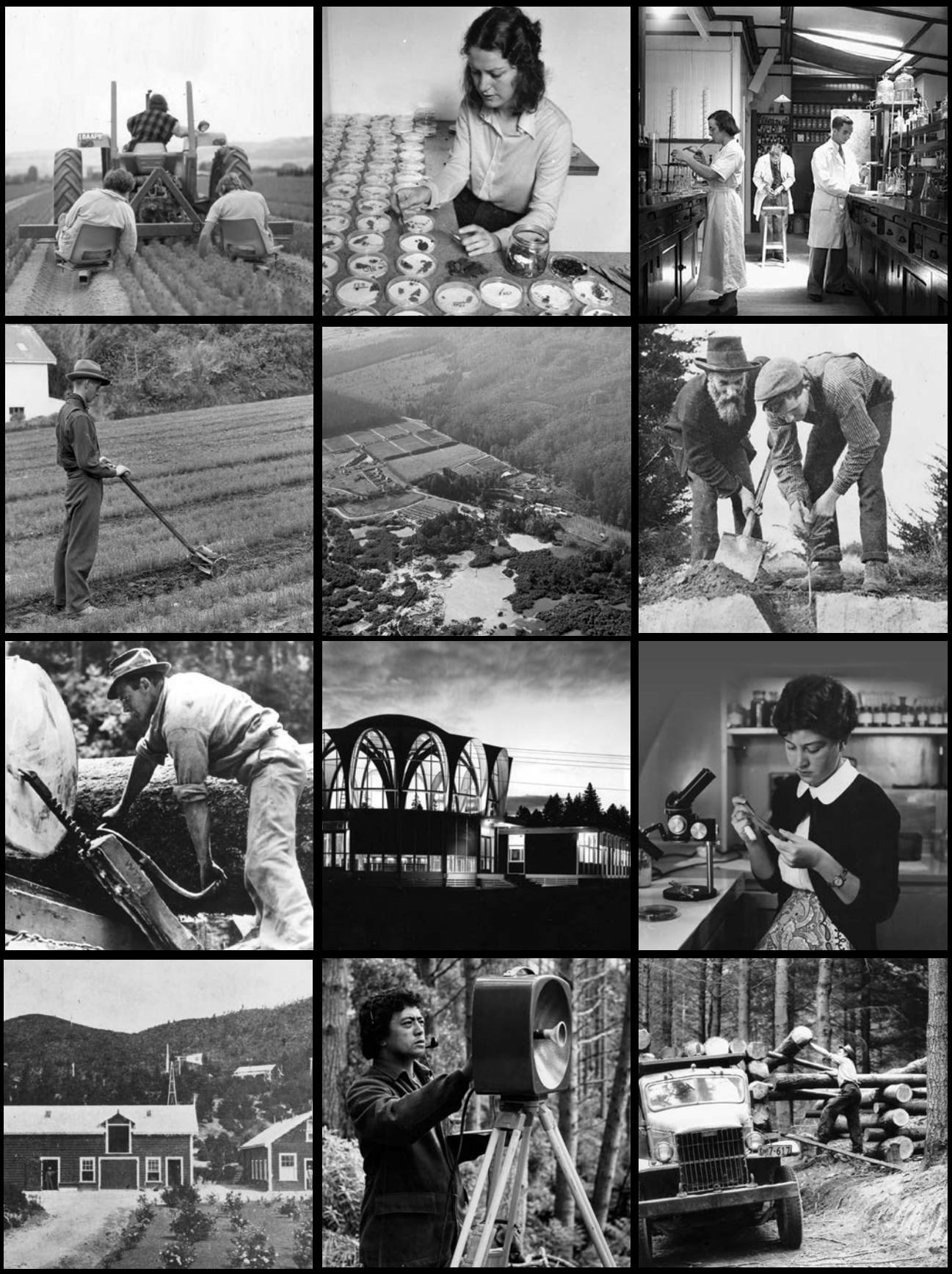

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