LINCOLN
UNIVERSITY
TE WHARE WĀNAKA O AORAKI

Sustainability and SDG Report 2024

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Cover Photo: Piri Cowie - Pouākai 2023,
Corten and stainless steel, Lincoln University Art Collection

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Tēna koutou

Welcome to our 2024 Sustainability and SDG Report.

Here at Te Whare Wānaka o Aoraki Lincoln University, we are uniquely equipped to address the critical needs of the land-based sectors. As the only specialist university among New Zealand's eight universities, our focused specialisation allows us to prioritise applied impactful research and educational programmes directly relevant to the challenges and opportunities facing the agrifood and tourism sectors.

At a time when society is demanding more efficient and sustainable practices, our significant contributions are advancing agriculture, agribusiness, tourism, environmental management, and recreation, aligning with the United Nations Sustainable Development Goals (SDGs).

Complementary to our focus on delivering specialist academic programmes and impactful research is our commitment to developing a more sustainable and enjoyable campus environment. Five years on from the commencement of the campus redevelopment programme, we now enjoy a campus with facilities that are fit for purpose, supporting our teaching, research, sport, recreation and the wellbeing of our staff, students and the wider community.

As part of our commitment to being an exemplar of sustainable practices for the land-based sector, the Lincoln University coal boiler was shut down in 2024, marking the end of our coal use and ushering in a new era of 100% electric-powered heating. By delivering electricity-powered heating and hot water around campus, we are taking huge steps towards advancing our decarbonisation programme.

This work, along with other sustainability initiatives and the campus redevelopment programme, forms part of the Lincoln University Sustainability Plan, which outlines our commitment to a sustainable future, including achieving carbon neutrality by 2030 and carbon zero by 2050.

This report gives a snapshot of our sustainability efforts in 2024 across all areas, including education, research, student experience and operations. Our efforts express our values of manaakitaka, looking after people, and caring for our whenua, the land.

Ngā mihi

Professor Grant Edwards
Vice-Chancellor
Lincoln University

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Te tau 2024 – he matapaki
2024 Key Facts and Figures

Student Numbers

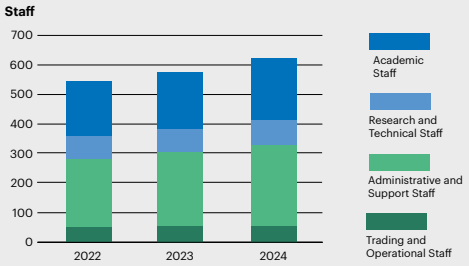
21%
growth
in enrolled students
on 2023

5484
Students enrolled in 2024

3744
Equivalent Full-time students
(EFTS)

Staff

8% growth
Full-time Equivalent
(FTE) Staff on 2023



Carbon Emissions

6,715
tCO2e

22%
Reduction from
baseline year

Renewable Energy

742,054kWh
generated on site

49%
of the total campus energy required

100%
Electricity
from certified renewable sources

Graduate Employment

82%
of graduates
in paid employment

of which

89%
of graduates
are working
domestically

Waste & Recycling

73% Landfill vs **27%** Recycling

19.6t **Food Waste** composted

32.8t **Plastic** recycled

7.8t **Cardboard** recycled

SDG 1

End poverty in all its forms everywhere

Scholarship tackles climate change and inequality

Inspired by His Majesty King Charles III, the King's Commonwealth Fellowship Programme (KCFP) was initiated in 2024, in response to the urgent economic, social and environmental development challenges affecting Small Island Developing States (SIDS). Lincoln University is a partner university of the PhD strand, offering the opportunity for citizens or those with refugee status from SIDS to study in areas related to climate change and the environment.

Building expertise in developing nations

The number of Manaaki New Zealand Scholarship graduates from Lincoln University increased significantly in 2024, from three in 2023 to sixteen, demonstrating the relevance and impact of the postgraduate programmes the University offers students from developing countries. The scholarships are administered by the New Zealand Ministry of Foreign Affairs and Trade as part of the New Zealand Aid Programme. Students were from developing nations, including Kenya, Timor-Leste, Guyana, Papua New Guinea, Indonesia, the Philippines, Laos, Zimbabwe, Myanmar, Vietnam and Vanuatu. The cohort has travelled to New Zealand to expand their expertise, before returning home to contribute to the economic and social development of their respective countries. They studied a range of postgraduate programmes including Master's of Management in Agribusiness, Master's of Horticultural Science and Master's of Environmental Planning and Management. One of the 2024 cohort of graduating students, Meriam Toalak from Vanuatu, successfully completed her PhD thesis on Identification and characterisation of *Phytophthora spp.* in New Zealand apple orchards.

Improving the distribution of produce in Bangladesh

Lincoln University Associate Professor Nazmun Ratna published the article I*dentifying value chain trade-offs from fruit and vegetable aggregation services in Bangladesh using a system dynamics approach*. The research indicates that, although significant progress has been made in cereal production in Bangladesh, many smallholder farmers remain poorly connected to markets, which could potentially result in a limited supply of fruits and vegetables.

Researchers investigated how an aggregation intervention (or loop), through modelling, could improve both the distribution of fruit and vegetables to smaller markets and farmer benefits. The modelling identifies the potential trade-offs between consumer outcomes in retail markets and farmer benefits and found that standalone and multiple market-oriented interventions generate broader win-win benefits to promote inclusive food systems.

Affordable and nutritious supplement for livestock

Lincoln University's Dr Titus Zindove co-authored a chapter in the book *Sustainable Forest Resources Management*, discussing how the use of fodder trees is a cheap alternative supplement for livestock when feed resources are scarce. Fodder trees are nutritious, can be easily propagated, require less capital and land, and can feed livestock during extreme climatic conditions, such as droughts. The authors also discuss the importance of communicating to farmers the challenges of using fodder trees as feed, noting that the use of technologies such as tannin-binding compounds and exogenous enzymes is essential for livestock to obtain nutrients from the fodder trees efficiently.

Farming challenges on the Qinghai-Tibet Plateau

Lincoln University Professor Jim Moir and a team of researchers have been monitoring grassland production on the Qinghai-Tibet Plateau to understand the challenges and pressures facing this vast grassland area, which is experiencing an increase in both human and livestock populations. In collaboration with Qinghai University in China, this research, spanning over 10 years, is examining soil fertility, with a particular focus on nutrient cycling in grazed grasslands and plant nutrition. Researchers have been studying nutrient flows, grazing pressure, land degradation, and the impact of climate change to enhance the long-term sustainability of these ecosystems, allowing farming to continue and support the economic prosperity of farmers in the grasslands. Over time, the researchers have trialled growing different legume species to help fix nitrogen in the soil, encourage pasture growth and improve the quality of feed for livestock.

SDG 2

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Connecting plant, animal and human health

Lincoln University researchers, led by Professor Pablo Gregorini, have identified a clear link between an innovative grazing management approach for cattle and significant health benefits for humans. The research outcomes demonstrated that beef cattle grazing from a selection of five separate strips of monoculture plant species (Adjacent Monoculture Strips or AMS), recorded up to 15% higher average daily weight gain and greater meat colour than cows grazing a conventional ryegrass-based pasture (perennial ryegrass) or those grazing a complex multispecies of 30 species.

Meat from the test animals was then consumed as cooked beef patties in human trials over six weeks. The participants' blood was tested at zero, three, and five hours after each meal. Blood samples from the trial participants who ate the AMS beef showed that their metabolisms were advantageously affected by consuming the test beef. Most significantly was an increased presence of Vitamin E (Gamma tocopherol), hydroxymethylglutaryl and arginine.

Underpinning the groundbreaking research is the discovery that the specific metabolomic properties of the five plant species grown in AMS strips, when foraged by the cows by choice, positively affected their metabolism. This finding highlights the interrelationships between plant, animal and human health and demonstrates the beneficial human health outcomes associated with consuming higher-welfare food products.

The Lincoln research team also conducted trials with dairy cows, sheep and deer using the AMS grazing system, achieving similar results in animal performance, environmental impact and welfare.

Growing call for a New Zealand food strategy

With many challenges facing New Zealand's food system, there is an increasing awareness of the need for a national food strategy to deliver greater resiliency. Lincoln University's Professor Alan Renwick is a leading voice in discussing the need for a strategy; however, he first emphasises the need to understand the depth of the challenges.

A more food-secure system would deliver greater access to nutritious food while meeting export targets, without causing undue environmental harm and creating large volumes of waste. To achieve this, Professor Renwick says both the productivity and profitability of New Zealand's food system need addressing.

The country's productivity growth rates have declined since 2000, with the primary sector unable to produce more with the same or fewer inputs. The sector is also struggling with profitability, with the relative price of inputs often rising faster than outputs. Food inflation in New Zealand has been on the rise since 2021, presenting further challenges for families struggling with food insecurity.

Professor Renwick suggests that a national food strategy needs to address how to build a more resilient system, and this can be achieved by diversifying away from the current specialisation model that has made New Zealand vulnerable, particularly to extreme weather events. He also suggests that a national food strategy should involve all stakeholders, considering all aspects of the food system at the farm level, as well as the health of all New Zealanders.

Revealing a Māori appetite for insects

Through the Joint Postgraduate School Food Transitions 2050 programme, Lincoln University's Chrystal O'Connor completed her PhD, with her research revealing a strong Māori interest in entomophagy (eating insects).

Chrystal has published a research paper in the *Journal of Insects as Food and Feed*, exploring Māori attitudes towards eating insects. In addition to understanding the history and perception of entomophagy in Māori culture, her research highlights potential future commercial opportunities among Māori.

She discovered that insects are hugely important to Māori, with 40% of respondents recognising insects as a significant food source, while 87% of respondents were willing to eat insects either whole or processed and were more likely to eat those native to New Zealand.

Reducing methane in dairy effluent ponds

A new project led by Lincoln University and Ravensdown marks the next step towards providing farmers with a cost-effective tool to reduce methane emissions from effluent storage ponds. Lincoln University research shows that treating effluent with iron sulphate can reduce methane emissions by over 90 per cent. Professor Keith Cameron says emissions from effluent ponds are the second-largest source of on-farm methane emissions from the dairy sector.

The new technology – the EcoPond effluent treatment system - will help reduce emissions and freshwater contamination from phosphate and E. coli bacteria. Researchers continue to collaborate with farmers to refine the technology, and subsequently with Ravensdown to develop a commercially viable, cost-effective version that farmers can utilise.

Methane-blocking extract from daffodils trialled

An extract derived from daffodils is being tested at Lincoln University following UK research that discovered its potential to reduce methane emissions from livestock.

Welsh research company Agroceutical Products discovered a naturally occurring compound from daffodils, haemanthamine, which may be effective in reducing methane production in cattle, following lab trials. AgriZeroNZ is partnering with Lincoln University to trial the methane-blocker on cattle. If the trials prove successful, haemanthamine will be developed as a new emissions-cutting tool for farmers.

It will be consumed by livestock, including ruminant animals such as cattle, sheep, deer and goats, as a feed additive. To produce compounds like haemanthamine and galanthamine, daffodils need to be grown in challenging, high-altitude environments and New Zealand's rugged hill country provides ideal growing conditions, allowing for a year-round supply.

Partnership looks at sustainable crop protection solutions

Lincoln University and Cellora Limited have signed a Memorandum of Understanding to bring together and capitalise on the University's world-leading research and Cellora's commercialisation expertise, focusing on developing effective and sustainable agri-tech solutions for on-farm application.

The new partnership will provide a pathway to market for University-derived technologies, providing solutions for food growers that are both effective and sustainable. This includes the University's research on novel bioactive compounds sourced from naturally occurring microbes, benefiting crop farmers worldwide.

Long-term focus on food sustainability

In 2024, the Joint Graduate School Food Transitions 2050 cohort of 40 students conducted postgraduate cross-disciplinary research to support the transition of national and international food systems to a more sustainable future, offering the food industry future innovation leaders.

The programme is a partnership between Canterbury-based research organisations: the University of Canterbury, Lincoln University, Plant & Food Research, Manaaki Whenua Landcare Research and AgResearch. The programme is unique and industry-relevant, with students being co-supervised by at least one of the Crown Research Institutes. There are four research streams in the programme: food and future landscapes, food for a zero-carbon future, food consumer transitions and food governance.

During their time in the programme, students attend conferences, monthly workshops and seminars, with invited speakers exposing them to thought leaders and influencers who are aware of local and global issues and opportunities within the primary sector.

Joint Graduate School Food Transitions 2050 PhD graduate Chrystal O'Connor attended the International Hope Conference in Kyoto, Japan, as one of five students travelling from New Zealand. The event provides young researchers with the opportunity to interact with more experienced scientists, including Nobel Laureates, as well as winners in the physics, chemistry, and physiology/medicine categories.

Research aids Canterbury potato recovery

Since its introduction to New Zealand, Tomato Potato Psyllid (known as TPP) has negatively impacted the potato industry. It is host to the bacteria *Candidatus Liberibacter solanacearum*, which manifests as 'zebra chip', displaying unattractive black marks on potatoes, preventing them from being sold for commercial use. At one point, 5.7% of Canterbury potato crops were infected by TPP. Lincoln University Associate Professor Clive Kaiser's knowledge of integrated pest management helped Canterbury growers control TPP and halt the spread of the bacteria.

Associate Professor Kaiser and his team of researchers studied the insect's lifecycle and breeding habits, and from there, were able to inform potato growers of an improved pesticide spraying programme aimed at targeting the pest earlier in its lifecycle.

This change helped stop the TPP population from spreading among potato crops. The Lincoln University team also assisted in the release of predatory insects of TPP, contributing to a decline in the population and significantly reducing the infection rate.

Sustainable and healthy food for all on campus

Lincoln University is committed to providing students and staff with sustainable and healthy food options on campus. Gluten-free, vegetarian, dairy-free, halal and vegan alternatives are available. In 2024, the catering team continued its efforts to expand the range of vegetarian and vegan meal options, sourcing local produce whenever possible. Water is freely accessible to all on campus via drinking water traps and filtered hot and cold water in kitchen facilities. The on-site cafes are open to students, staff and the public, along with a student dining hall and catering services for events.

Demonstrating best practice sustainable farming

Owl Farm is a joint venture between St Peter's School Cambridge and Lincoln University, established to take on a leadership role in demonstrating best practice dairy farming and sustainable farming practices on a working farm. The dairy farm annually opens its farm gates to the public to share agricultural knowledge with those in the industry and beyond. Owl Farm also provides an opportunity for school-aged children to learn about the career opportunities in the food and fibre industries. The annual open day features stands hosted by industry partners, including Lincoln University, PGG Wrightson Seeds, Fonterra Farm Source, Ballance Agri-Nutrients, and Dairy NZ. Children who visited on the Open Day were given a dairy expert passport containing questions, with answers found at each stand. Activities on the farm included calculating the pH levels of different drinks, discovering the nutrients plants need to grow, and watching the cows being milked.

Supporting students experiencing hardship

Lincoln University established a food bank in 2020 to assist students experiencing hardship due to COVID-19, and since then, the cost-of-living crisis. Initial funding was received by Hardship Fund for Learners (HAFL) through the Tertiary Education Commission, and it has later relied on donations.

In 2024, care packages were given to students experiencing illness or hardship. To receive a package, a student informs a staff member at the University that they are experiencing hardship, and from there, it is discussed what type of support would be most beneficial, with an appropriate package being prepared.

SDG 3

Ensure healthy lives and promote wellbeing for all at all ages

Building wellbeing in the next generation of farmers

The WellMates programme, a mental health collaboration between researchers and wellbeing staff from Lincoln University and Massey University, has grown year-on-year since 2021, delivering an important resource to students that focuses on de-stigmatising conversations around mental health and wellbeing. Funded by Massey University and Lincoln Agricultural Industry Trust, WellMates is delivered to first-year students enrolled in agriculture courses at either University. In 2024, WellMates was delivered to an additional 75 students at Lincoln, completing a business management course. To do this, the content was presented to the entire class of up to 90 students utilising more facilitators, rather than splitting the students into smaller groups as has been done previously. The sessions received positive feedback from participating students and may allow for their delivery to more programmes in the future.

Initiative boosts wellbeing on campus

The Sports and Healthy Living Initiative, supported by Rabobank (Rabo Community Fund), Scales, ANZCO, Canon, the former Lincoln University Chancellor Tony Hall and family, and an anonymous supporter, creates opportunities to enhance student wellbeing at Lincoln University and bring people together through sport. Since 2022, the initiative has funded a range of items, including swimming pool access, climbing shoes, and equipment for social sport. The most recent purchases have been table tennis tables and tennis nets. Its positive impact has been noted by Lincoln's Sports Co-Ordinators, who say many students have tried a new sport, creating an opportunity for building connections with other students without the barrier of cost.

One of the standout successes has been funding access to swimming at the Selwyn Aquatic Centre, introducing a new activity that boosts student wellness.

Encouraging personal growth through sports

The Lincoln University gymnasium, Whare Hākinakina, has a close association with the Selwyn Sports Trust, hosting sports events designed to bring together primary and high school-aged students, encouraging active participation and personal growth. The major sporting tournament organised by the Trust, the Koru Games, is held annually for Years 7 & 8 students from around the South Island. Over three days, the sports tournament offers an accessible opportunity for students to develop their skill sets by playing a team sport for their school. Lincoln University hosts the volleyball, Korfball and dodgeball competitions.

Another sporting competition organised by the Trust, the Rangatahi Programme, is sponsored by Lincoln University. Teenagers from across the Selwyn district compete in sports tournaments and can attend the Sport Captain Conference.

WellMates co-creator wins 2024 Rural Professional of the Year

FARMAX-FarmIQ and the New Zealand Institute of Primary Industry Management (NZIPIM) celebrated the outstanding individuals involved in New Zealand's primary industries in 2024. Lincoln University Senior Lecturer Dan Smith was awarded the Rural Professional of the Year, recognising his dedication to teaching and mentoring over 500 students each year and his work in designing and developing the WellMates programme, which aims to help equip students with the tools to support their mental health.

Accessible recreational spaces for all

People of all ages in the community are welcome to participate in sports and recreational activities at Lincoln University's gymnasium, Whare Hākinakina, and the surrounding fields. The Active Kids programme is for toddlers aged under-five. Many high schools from surrounding areas bring their students to use the boulder wall and group exercise areas. For seniors, Whare Hākinakina has a longstanding 28-year partnership with Lincoln Community Care Association, providing exercise classes for adults aged 60 years and over. Representative sporting teams of various codes utilise the gymnasium and sports fields for training and matches, including local rugby clubs, men's and women's representative sports teams. National sporting competitions were held at Lincoln University's Bert Sutcliffe Oval which hosted the Gillette Cup men's and women's competitions as well as representative national age group competitions.

Helping students transition to university life

Lincoln University's long-running Kaiwhakarite Tauira Student Buddy Programme helps students of all ages and levels of study transition to university life. Student buddies are current students who volunteer their time to help first-year students, often from outside the Canterbury region or overseas. In 2024, eight Buddies provided guidance to students on campus. They are all from various countries across the globe and are mostly post-graduate students. Their support includes answering questions and directing new students to campus resources, such as clubs and activities, which provide opportunities to build connections and friendships —a crucial aspect of a student's wellbeing while at Lincoln. Every Tuesday on campus, a student buddy lunch is held, where students can come along, eat their lunch, chat and play games.

Tools to support employees' mental health

The physical and mental wellbeing of Lincoln University staff is a top priority, acknowledging that throughout people's lives, many challenges are faced. To help during these difficult times, staff can easily access the Employee Assistance Programme – Clearhead, an online mental health and wellbeing platform that offers evidence-based digital tools to support staff in managing their wellbeing. Resources include a Digital Wellbeing Assistant and access to confidential counselling sessions with a Clearhead therapist for staff and their immediate family. Every month, Clearhead offers an online session for all, with a new theme each month. During 2024, for example, sessions were run on men's mental health and tools to support the mental health of those who are also managing bipolar, schizophrenia or depression, and/or neurodivergence such as autism or ADHD.

SDG 4

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Course completion rates highest in New Zealand

Students studying at Lincoln University have achieved the highest course completion rates across New Zealand's eight universities in 2024. The latest Educational Performance Indicators (EPIs) released by the Tertiary Education Committee (TEC) reveal a course completion rate of 91% for Lincoln University students in 2024. Measuring the educational performance of New Zealand university students at bachelor's degree level and above, the EPIs include course and qualification completion rates and first-year retention rates.

Lincoln University's Level 7 cohort (mainly bachelor's degrees) achieved the highest course completion rate for the fifth consecutive year, this year achieving 94% course completion rate – the sector's highest by 3.4%. The first-year retention rate was the highest for the third consecutive year, at 88%. Lincoln University also achieved the highest course completion rate and first-year retention rate for Māori students, at 92% and 88% respectively, as well as the highest completion rate for Pasifika students, at 82%. Deputy Vice-Chancellor Māori, Professor Merata Kawharu, says the Te Manutaki team provide outstanding culturally based wraparound support for Māori and Pasifika students, including academic mentoring, cultural guidance, wellbeing and proactive outreach services.

Online learning offers students greater flexibility

Lincoln University's asynchronous online learning platform has received international recognition for its engaging and interactive content, winning two awards at LearnX 2024. The Online Learning team were awarded the Platinum Award for Best EdTech - Blended Learning and the Platinum Award for Best eLearning Design – Video, recognising the importance of delivering content that makes students feel connected to a community of learners.

In 2024, 11% of Lincoln University's total full-time students were studying through asynchronous online learning, representing a 24% increase from 2023. This offering caters for students who are unable to come onto campus and require greater flexibility. With many online students currently working, online learning reaches people who may otherwise have been unable to pursue further study. To date, 62 asynchronous online courses have been developed. In 2024, the final programmes were completed: the Master of Planning, Master of Tourism Management and a newly renovated technology-enhanced regional delivery model of the Diploma of Horticulture. The project also completed postgraduate student training and an online module exploring Lincoln University's cultural narrative.

New programmes respond to industry needs

The launch of the Bachelor of Sustainable Tourism and Master of Parks Management in 2024 demonstrates the high level of industry-relevant education and research programmes delivered at Lincoln University. The new programmes are unique and firsts for New Zealand, and have been designed to equip graduates with the skills to tackle real-world challenges, building on the University's strong legacy in parks, recreation and tourism education.

Supporting conservation management in developing countries

Lincoln University and the Global Environment Facility (GEF) have jointly established the Gustavo Fonseca Applied Conservation Fellowship Programme to provide fellowship and scholarship support for Master's and PhD students from developing countries and countries with economies in transition. The Gustavo Fonseca Scholarships, named after the late Dr Gustavo Fonseca, an eminent conservationist, will support students from GEF-recipient nations in the Asia-Pacific region who undertake research aimed at addressing environmental issues or developing methods and field practices to foster conservation management and leadership skills. An initial cohort of seven postgraduate scholarships for Master's and PhD programmes focused on aspects of applied conservation were welcomed to Lincoln University to commence their studies in 2024.

Māori and Pasifika wellbeing and academic success

The Manaaki Tauira Framework supports Lincoln University's initiatives to increase the participation levels of Māori and Pasifika students. In 2024, noticeable increases were achieved in course completion rates for Māori and Pasifika students. Notably, the disparity between Māori and non-Māori and non-Pasifika course completion rates narrowed to just 0.1%, an exceptional achievement.

Te Manutaki | Office of Māori and Pasifika Development delivers comprehensive student support, including study assistance, scholarships, wellbeing and cultural engagement, through multiple initiatives. The Haumanu Māori and Pasifika Learner Wellbeing Programme offers first-year student mentorship from senior students, alongside wellbeing check-ins and cultural activities that emphasise Māori values and promote cultural competency. The Pito Mata Internships and Scholarships foster partnerships with Māori organisations, while the Ka Tipu, Ka Rea Kura -Lincoln University Pathway facilitates the transition from kura kaupapa to university, focusing on tertiary study readiness and resilience. For staff, the Ka Uara Living Our Values workshop offers a deeper understanding of Te Ao Māori and how to incorporate Māori values into professional practice. Finally, the Te Ahu Pātiki Leadership Programme holds oho wānaka at Wairewa marae for tuākana mentors, offering an immersive cultural learning relationship-building experience.

Popular fee waiver scheme continues

As a specialist land-based university, Lincoln has strong connections with the food, fibre and environmental sectors, conducting valuable research for industry and producing highly employable graduates in areas that urgently need more qualified people. To support this focus, the popular fee waiver scheme was available again in 2024 for selected postgraduate, taught Master's and the taught component of research Master's programmes for domestic students. This initiative enabled 1,864 students to study across 46 tuition-free qualifications, covering subjects such as agricultural systems, food innovation, conservation, environmental management, accounting, sport and recreation management, applied science and commerce.

Inspiring young children to higher learning

Te Mātāpuna Mātātahi Children's University is offered through a partnership between Lincoln University and the University of Canterbury. The programme is part of an internationally renowned outreach programme that aims to foster lifelong learning among young people aged 7 to 14. In 2024, 1,152 children from 48 schools and two rūnanga graduated in Canterbury, marking the programme's fifth year of success. To achieve this notable outcome, the children completed 67,714 hours of extracurricular learning. The programme included a visit to the Lincoln campus to give young learners an understanding of universities. With 510 pupils in attendance, they participated in a series of hands-on activities designed to broaden their interests and demystify the academic environment.

Introducing food and fibre industry careers pathways

Within the Faculty of Agriculture and Life Sciences, Farms Educational Facilitator Lauren Roberts hosts predominantly urban high school students on Lincoln University's demonstration farms, enabling them to experience a working farm and offer insights into potential careers in the food and fibre industries. Highlights in 2024 included 18 high schools visiting Lincoln's campus, with some also touring the onsite Zero Invasive Pests facility to showcase the research in pest management and conservation.

The University hosted its first Soils Day in 2024, attended by 126 students from five different schools.

Removing financial barriers to study

To deliver inclusive education to all at Lincoln University, $3,468,473 in scholarships was offered in 2024. Of this figure, numerous scholarships were available for Māori and Pasifika students, totalling $249,770. Two premier undergraduate scholarships, the Tihi Kahuraki Scholarship and the Motu Scholarship, each offer up to $25,000 per year for the duration of the degree to cover both accommodation costs and tuition fees.

Leadership programme highlights food system careers

A long-established and highly regarded scholarship offering at Lincoln University, the Future Leader Scholarship Programme enables participants to complete an integrated leadership programme alongside their academic studies. During the participants' third year of study, they must complete a project of their choice, with assistance from first and second-year students in its delivery.

For 2024, Lily McClure and Katie Brown led the Farm 2 Future project, sponsored by Rabobank, which included a team of nine scholars. The camp introduced 24 Year 12 students from across New Zealand to career opportunities in the food and fibre industries through a fully funded, three-day camp. Participants visited a range of Canterbury land-based businesses, from dairy and sheep farms to food production companies, offering them a comprehensive view of the sector from paddock to plate. The goal of the project is to introduce high school students to career possibilities, with half of the pupils residing in an urban environment and having no prior agricultural experience. The feedback from the high school students was overwhelmingly positive, with the Lincoln University scholars able to deliver a relatable and customised experience through the 'by students for students' philosophy.

Research highlights importance of experiential learning

Lincoln University researchers drew on insights from eight land-based educators and published their findings in *The Journal of the New Zealand Institute of Primary Industry Management*. Their research emphasised the importance of land-based education for the future of New Zealand's food and fibre sector and highlighted the benefits to students of experiential and kinaesthetic learning. Although students have different learning preferences, the researchers found that they all respond positively to active learning and the practical insights gained through experiential learning.

SDG 5

Achieve gender equality and empower all women and girls

Uplifting Lincoln University female students

A local organisation dedicated to uplifting Canterbury women awarded scholarships to eight Lincoln University students to assist them financially in furthering their education in their final year of study. Graduate Women Canterbury encourages women to succeed in their desired fields and helps bring the vision of barrier-free education for all women one step closer.

To recognise the importance of removing financial barriers to women in study, Lincoln University offers two further scholarships to women: the Lincoln University Suffrage Centennial Undergraduate Scholarship which is open to female students entering their final year of study, and the Ann Scanlan Memorial Scholarship awarded to a female student in their second or subsequent year completing a Bachelor or postgraduate qualification with a focus on wool.

Pathways into land-based learning

Lincoln University continues to support women in studying in the land-based sectors. Since 2018, a continuing trend has been that the University's student population sees females outnumbering males. Of the total number of students in 2024, 5,484, females totalled 3,054 (55%) while males were 2,423 (44%). Diverse students totalled 7(1%).

Memorial recognises world-first for women

Te Whakaoranga is a volunteer-led project formed to enhance the Kate Sheppard National Memorial site in Christchurch.

The memorial represents one of New Zealand's most significant achievements: the first country in the world to grant women the right to vote in 1893. The memorial is a stone aggregate wall, with a life-size bronze sculpture of Sheppard and five other women's suffrage leaders. Panels on either side of the sculpture depict scenes from women's lives of the time, accompanied by text that describes the struggle for women's suffrage. Included in the volunteer team is Lincoln University's Professor Jacky Bowring. Together, the group wants to enhance the memorial site, which is currently underwhelming and difficult to find, by improving the surrounding area without altering the memorial itself.

Cultivating confidence in young women

Dr Hafsa Ahmed, a lecturer from Lincoln University, visited Rolleston College to facilitate a leadership development session for girls from ethnic backgrounds. With her expertise in leadership, Dr Ahmed guided the participants through introspection and practical tools to cultivate confidence, helping them kickstart their journeys beyond high school.

Career development programme for professional women

The Lincoln University Career Development Programme for Professional Women was successfully completed by 26 participants in 2024. Over the past three years, of the approximately 200 eligible female staff, 116 have completed the course to date, with overwhelmingly positive feedback received from participants. This specialised programme supports Lincoln University's non-academic female staff to determine their preferred career pathways and options for development.

The innovative programme offers a multi-layered initiative targeting professional women, including motivating and interactive group work as well as individual assessment and one-to-one coaching.

Early Childhood Centre celebrates 30 years

Lincoln University's Early Childhood Centre celebrated its 30th birthday in 2024. Initially built to meet the exclusive needs of students and staff, the centre now also accepts enrolments from the wider community and is licensed for 33 children, with nine aged under two.
The centre provides a learning environment consistent with Te Whāriki, New Zealand's Early Childhood Education curriculum guidelines and is recognised internationally among early learning practitioners. Reviews of the centre's operation are conducted regularly by the Education Review Office, and the most recent one describes the centre as offering a 'settled and peaceful learning environment'.

It also notes the positive interactions available with the university through supervised visits to the campus grounds and facilities. Earlier reviews have commented that 'staff respect and value the diversity of their families with bicultural and multicultural and community backgrounds and endeavour to provide appropriate support'.

Encouraging rural women into the workforce

Lincoln University's Professor Wanglin Ma was invited to present at the Department of International Economics, Faculty of Economics, Hosei University, Tokyo, Japan, on 'Agricultural mechanisation and non-farm employment of rural women'. His research, using data from the 2016 China Labor-force Dynamics Survey, found that mechanisation adoption increases the probability of rural women participating in non-farm work and wage employment in both local and migrated non-farm settings, with the impact greater for unmarried women than married women.

Professor Ma's analysis also showed that relative to non-mechanised farming, the adoption of semi or fully mechanised farming increases the probability of rural women with fully mechanised farming playing a larger role.

Fostering a safe and inclusive community

Lincoln University is committed to providing a safe, inclusive, respectful and welcoming environment - both physical and digital – to support students and staff to achieve their full potential. This includes robust equity, diversity and inclusion strategies with measurable outcomes. Gender equity is actively promoted at the University, with dedicated resources, policies and expertise to address gender bias and unconscious bias. The Staff Equity, Diversity, and Inclusion Steering Group is responsible for creating a supportive and inclusive environment that encourages the recruitment, development and retention of a diverse staff community.

The University has several policies in place for both students and staff, designed to ensure equality for women and minority groups across the student, academic and professional staff community. These policies include the Equity, Diversity, and Inclusion Policy, the Equal Opportunity in Employment Policy, the Flexible Work Policy and the Prevention of Bullying, Harassment, and Discrimination Policy. In the Annual Report, gender-disaggregated data on personnel and students are provided.

SDG 6

Ensure availability and sustainable management of water and sanitation for all

Collaborative research tackles global water issues

In 2024, Lincoln University hosted the New Zealand-China Water Research Centre Workshop on campus, with over 50 delegates from China and New Zealand attending, representing a range of scientific institutions and universities. Hosted by Lincoln University, the New Zealand-China Water Research Centre partners with AgResearch, Landcare Research, Plant and Food Research, Lincoln Agritech Ltd and the University of Otago. It is one of three centres funded by New Zealand's Ministry of Business, Innovation & Employment (MBIE) to strengthen research collaborations between New Zealand and China.

The New Zealand-China Water Research Centre coordinates and facilitates long-term collaborations between scientists from New Zealand and China. The centre conducts workshops and joint research programmes, while hosting visiting scientists and students. The research aims to address global issues, including water contamination, efficient use of water resources, greenhouse gas emissions and climate change. To date, researchers through the centre have conducted more than 20 workshops and produced more than 100 joint publications.

Developing a greater understanding of river systems

Lincoln Agritech Limited, a 100% owned subsidiary of Lincoln University, has led research that reveals the complex relationship between braided rivers and regional aquifers, aiding the future management of rivers through understanding how they store water.

In the paper *Conceptualising surface water/groundwater exchange in braided river systems,* published in the journal *Hydrology and Earth Science Systems*, the authors studied Waikirikiri/Selwyn River in Canterbury, the Wairau River in Marlborough and the Ngaruroro River in Hawke's Bay.

Their research discovered the importance of braidplain aquifers and the need to consider a river as a system, rather than just the active channels. Braidplain aquifers are thin deposits of loose gravel that contain less fine material than the surrounding sediments and act as a shallow storage reservoir within a river system, making it distinct from the regional aquifer system. The authors found that a river transfers water to a braidplain aquifer first, and from there, the water is transferred to a regional aquifer.

Maps indicate potential groundwater contamination

New national maps, based on a modelling methodology developed and refined over the past decade, have been produced by scientists at Lincoln Agritech - a 100% owned subsidiary of Lincoln University, and ESR. The maps indicate where groundwater nitrate contamination is unlikely to be an issue within New Zealand, even in areas that haven't been specifically tested. Nitrate contamination can be an issue due to differences in land use and the groundwater's natural denitrification potential. The model utilises information from sources such as soil, geology and hydrology, linked to wells where the redox state is known, to predict the redox state of groundwater in regions lacking existing data. The redox state indicates the groundwater denitrification potential and the likelihood of nitrate contamination.

Supporting farmers with freshwater reforms

Lincoln University received funding from the Ministry for the Environment for the project "Building the ag into the enviro", a professional development programme delivered to non-agricultural students studying in areas such as policy, advisory, or regulatory with little knowledge of farm systems and capability, to equip them better to work with farmers to support the implementation of freshwater reform including waterway protection and restoration. Part of the funding has been allocated to the Engage programme, which is developed and delivered collaboratively by the NZ Rural Leadership Trust. Held over three days, the programme includes workshops, field trips and presentations from industry leaders.

Securing the future of freshwater fish

Senior Lecturer from Lincoln University, Dr Marc Tadaki, co-leads Fish Futures, a 5-year research programme funded by the Endeavour Fund from the New Zealand Ministry of Business, Innovation and Employment. The programme incorporates Māori and the greater community with a transdisciplinary freshwater science and management approach to understanding the effects of climate change and ecosystem dynamics on the future of freshwater fish. In the journal *People and Nature*, the article *Horizontal portability: A proposal for representing place-based relational values in research and policy*, co-authored by Dr Tadaki, explores a new way of communicating the value of nature in ways that respect local, place-based perspectives to ensure unique, context-specific values remain intact while sharing them across different places, communities and knowledge systems. The article was written for researchers, facilitators, and policymakers who seek to represent these unique values in their decision-making by offering practical recommendations on how to make research, policies and actions more inclusive.

Supporting river restorations

Dr Issie Barrett, Lecturer from Lincoln University, co-authored the article *A short-term home with long-term potential: temporary aquatic habitat additions to support macroinvertebrate colonisation* published in the *New Zealand Journal of Zoology*. The research examines river restoration projects and the importance of incorporating multiple factors to achieve improvements in ecological health, including water quality, riparian vegetation and habitat beneath the water surface. Researchers trialled the addition of simple, instream habitat units as a restoration tool targeting aquatic macroinvertebrate communities built from readily available, biodegradable materials. All habitat units showed significant increases in macroinvertebrate densities and taxon richness compared to the surrounding existing habitat. These results demonstrate the potential of small-scale, short-term habitat additions as a restoration tool, helping to inform the design and implementation of more permanent restoration measures in future.

Fresh water available to all on campus

In 2024, water consumption at Lincoln University was carefully monitored to ensure all those on campus were consuming safe, drinkable water. During the year, the water supply was tested 223 times at multiple locations, and a turbidity meter was installed to monitor the water's clarity. A Source Water Safety Management Plan was implemented in 2024, mapping the area of the University's water supply (underground) and possible risk factors and mitigation. The total water usage on campus was 183,941,000 litres, down slightly from 2023 at 194,839,000 litres.

SDG 7

Ensure access to affordable, reliable, sustainable and modern energy for all

Energy farm to be a New Zealand first

Lincoln University will increase its solar generating capacity with the construction of an agrivoltaics installation. The Lincoln University Energy Farm will demonstrate how one site can be optimised to produce high-value horticulture, and at the same time, generate commercial-scale energy. This will be the first in New Zealand to grow commercial crops below and between the rows of panels.

A distinctive feature of the Energy Farm will be its ability to host a comprehensive range of experiments and crop trials, contributing to leading-edge practices that can be replicated and rolled out across New Zealand and the world. As well, an electric Knegt 404G2E 55HP tractor from the Netherlands will be used on the farm and is the first of its kind in the country.

The 1.5 MWp solar installation will comprise ~2880 bifacial photovoltaic (PV) panels in rows pitched at heights of 2.5m and 3.1m, spaced at 14m intervals, allowing for diverse crop cultivation alongside and underneath the panel structures. The array will directly supply the University with ~2.3 GWh of renewable energy per year. When the Energy Farm array comes on stream, the University's combined solar energy generating capacity will reach ~3.56 GWh, or around 18% of the expected annual electricity requirements of the campus.

Saying goodbye to coal use on campus

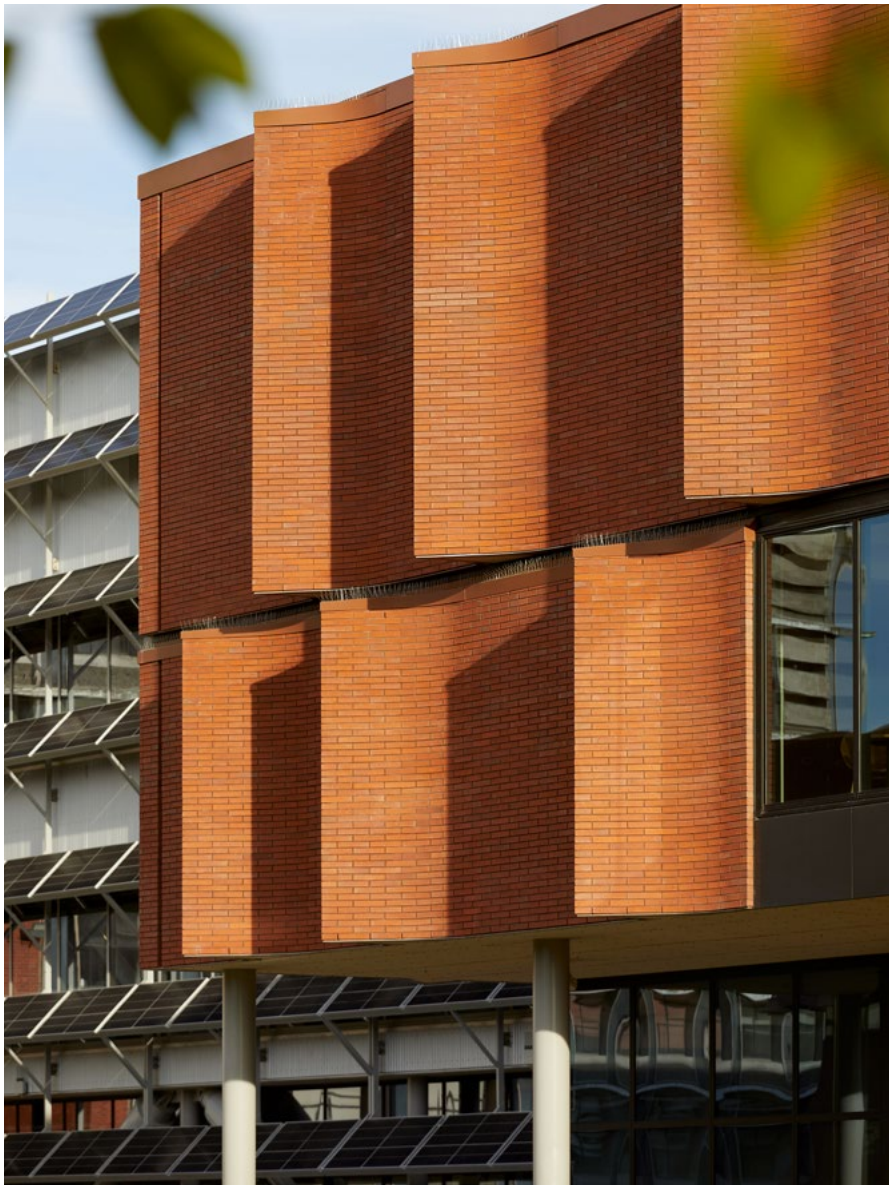
The boiler at Lincoln University was switched off for the final time, ending the use of coal and ushering in a new era of 100% electric-powered heating on campus. Delivering electricity-powered heating and hot water to all campus facilities, rather than coal-powered, allows the University to take a huge step towards achieving the carbon emission target of 2,500t CO_2e by 2030 with all of the University's hot water and heating now coming from electric boilers powered by either certified renewable electricity or generated from solar photovoltaic arrays located on campus.

Improving sustainable energy consumption on campus

In 2024, 742,054kWh of renewable energy was generated on campus at Lincoln University. To support the delivery of sustainable energy consumption, the University's HV electrical upgrade was completed in 2024 at the Ivey, Glasshouse and New Halls Substations. The campus heating upgrade made significant progress in 2024 with installations across the campus, including all the main buildings.

Innovative solutions to generating electricity

In an article published on The Conversation, Lincoln University's Dr Faith Jeremiah discusses how wastewater pond surface areas can be utilised for floating solar panels to generate power. Wastewater ponds are an underutilised surface that could help tackle two problems at once – high power prices and algal growth. Floating solar panels would generate renewable energy, improve water quality in the treatment ponds and reduce costs. Leading this approach is the 2020 installation of New Zealand's first floating solar array at the Rosedale wastewater treatment plant in Auckland, comprising 2,700 solar panels and 4,000 floating pontoons. Discussion around energy production is particularly timely in New Zealand, as the country faces increasing electricity demand while managing ageing infrastructure and navigating a challenging transition to renewable energy sources.



Green campus status achieved in GreenMetric rankings

Lincoln University significantly improved its global sustainability ranking in the UI GreenMetric World University Rankings for 2024, moving up nine places to 85th and is the only New Zealand university to participate in this ranking. A total of 1,147 universities from 95 countries participated in the UI GreenMetric ranking system, an initiative of the University of Indonesia. A non-profit operation, it publishes annual university rankings on sustainability. The UI GreenMetric ranking system rates each institution on its commitment and actions towards sustainability, with each university's assessment is based on three pillars – environmental, economic and social value – and incorporates the six indicators of setting and infrastructure, energy and climate change, waste, water, transportation, education and research.

Lincoln University scored 8,565 points out of a maximum of 10,000 points, achieving its highest rankings of 66th in the indicator of Setting and Infrastructure, 97th for Transportation and 104th for Education and Research.

SDG 8

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Career pathways for future land-based leaders

Graduate employment outcomes have long been considered an indicator of Lincoln University's success in meeting both the needs of the land-based sector and supporting students' career aspirations. Latest post-qualification figures show that Lincoln achieves high employment outcomes, with a graduate employment rate of 82%. Of these, 88% work full-time, and 31% work in the agriculture, forestry, and fishing industry. Graduates also find further education an attractive proposition, with 23% entering further study.

Lincoln University's intertwining relationships with industry, community, and government stakeholders enable it to respond to changes and ensure that its educational programmes and postgraduate research are timely and impactful. This intense focus is supported by the Tertiary Education Commission's Post-Study Outcomes data for 2024, which shows that the University has the highest percentage of students under 25 years of age in employment among all New Zealand universities.

Fostering cross-culturalism and leadership skills

At the 2024 Lincoln University Graduation, alumna Deborah Gilbertson was awarded an honorary Doctor of Science for her contributions to education. During her 40-year career, Deborah has worked in the science and technology sectors, providing leadership opportunities for women and encouraging cross-culturalism.

In the 1980s, Deborah established a Women in Science Network with the then DSIR. With Lincoln University's support, she helped establish the Women in Agriculture Network, which reached 10,000 members in its first decade of operation. In the mid-1980s, she led a National Venture Capital Industry Development Workshop, which resulted in significant policy changes and an increase in the number of venture capital organisations. During this time, she also founded the Emergent Māori Women's Leadership Programme and, in 2006, established the Te Kaihau Education Trust. Through this trust, Deborah was awarded a United Nations Alliance of Civilisations Award for her 'Global Enterprise Experience' contest and its impact on fostering cross-culturalism, peer leadership and social enterprise internationally. Deborah's current work includes developing graduate diplomas to help emerging innovators advance their new ventures. She is committed to the transformative power of science and the impact of new ventures that address the United Nations Sustainable Development Goals.

Shining a light on career pathways

A collaboration with the New Zealand Institute of Food Science & Technology enabled Lincoln University students to meet with seasoned industry professionals and receive mentoring on their future careers. The event included presentations by Lincoln researchers, with Food & Sensory Science lecturer Dr Shaoyang Wang sharing the important role of food sensory science in the industry.

The event then invited industry mentors to speak with students, allowing them to meet a wide range of prospective employers and, most critically, meet people who have had similar experiences. Many of the 16 mentors were Lincoln alumni, who spoke of how their studies opened up pathways into the food industry. Bachelor of Science (Food Science) student Krugar Giffith said talking to the mentors gave him an advantage heading into his career, as he now understood what employers were looking for and the challenges they might face in the future.

Internship provides international experience

The international shipping company Kuehne + Nagel has long been employing Lincoln University graduates for work overseas. Executive Vice President of Sea Logistics, Michael Aldwell, National Managing Director, Simon Dedman and Head of Sea Logistics Americas, East Asia & Oceania, Marcus Reimann, spoke to a group of Supply Chain Management students on campus in 2024, offering industry insights and information about the internship. The Kuehne + Nagel internship scheme saw one of its largest intakes of Lincoln graduates in 2024, with eight Supply Chain Management graduates accepted for the 12-month internship based in New York, with another four heading to Australia. For eight years, Kuehne + Nagel has expanded Lincoln's internship programme, providing graduates with comprehensive experience within the company and kick-starting their careers. The internship is open to any student who has completed a major or minor in the Supply Chain Management programme at Lincoln University.

Developing good leaders and cultural awareness

Always in high demand, Lincoln University's Staff and Learning and Development Programme delivered 40 courses during 2024 with 807 attendees. New courses included Introduction to Te Reo Māori, Introduction to te Tiriti o Waitangi, Intermediate Te Reo Māori, Intermediate te Tiriti o Waitangi, Cultural Intelligence, Living Our Values, Research Data Workshop and Risks and Obligations for Managers.

The highly successful Lincoln University Leadership Programme continued into its third year, with 106 managers participating in workshop one, 89 completing workshop two, and 62 completing workshop three. Twenty-nine managers attended a check-in session by the end of 2024. Lincoln University's Senior Leadership Team also undertook the programme this year, showcasing that managers with little or extensive experience have much to gain from this course.

Practical work better prepares students for their careers

At Lincoln University, practical work (work-integrated learning) is a key component of study programmes, providing students with diverse career experience. Required for over twenty qualifications, or 60% of the University's programmes and majors, this experience aligns with the student's professional goals, and employer feedback helps inform programme development. Lincoln University's Post Qualification Outcomes Survey confirms its value, with students finding it extremely useful for gaining employment.

Creating connections in the food and fibre sectors

The third annual Lincoln University Food and Fibre Awards and Networking Dinner was well-attended in 2024, bringing together a diverse range of industry professionals and students to network and celebrate academic achievement. A total of 193 students attended the evening to meet and engage with 49 industry professionals from organisations within the food and fibre industry, such as AgReserach, ANZ, ANZCO Foods, Alliance, Ballance, Barenbrug, Beef+Lamb New Zealand, Catalyst Performance Agronomy, Farmlands, Kuehne + Nagel, Lumen, Ministry for Primary Industries, Macfarlane Rural Business, Perrin Ag, PGG Wrightson, Rabobank and Ravensdown.

During the evening, Lincoln University's Professor Moot hosted a panel of alumni, featuring Tony Dodunski of AgAssist and Harri Wulff of Winseed, who shared their stories from their days at Lincoln University and how they developed their careers. The awards recognised 19 students for their success and diligence in their chosen fields. They were presented by Professor Grant Edwards and the Honourable Mark Patterson, Member of Parliament. Faculty of Agricultural and Life Sciences student Amelia Ridgen, who won both 1st Year Top Student and Agricultural Science Student of the Year, said the event provided a valuable way of building connections with industry professionals and has given her ideas on what she might do on completion of her studies.

Adapting career modelling for Māori

Senior Lecturer at Lincoln University, Dr Mohini Vidwans, co-designed a career framework for Māori, as most previous models have had a Eurocentric focus and were based on the lived experiences of majority groups. Dr Mohini and co-researcher Lynette Reid proposed an enhanced Māori career framework based on their research with wāhine Māori accountants in New Zealand, which they presented at CATE Conference in 2024 with attendees in the career and guidance practices. The career framework illustrates how career pathways are experienced within dimensions of whānau (family), whanaungatanga (collectivism, relationships) and Te Ao Hou (new world). Whānau is central to one's cultural identity and societal acceptance, i.e. sense of belonging; whanaungatanga refers to relational practices engaged in across structures and organisations, and Te Ao Hou relates to Māori understanding of the contemporary world.

SDG 9

Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

Flower scanning robots could revolutionise wine industry

A project utilising Lincoln University viticulturalists, led by the University of Canterbury, aims to develop robots for use in vineyards to record more accurate yield estimations, enabling growers to collect reliable data on the amount of fruit their vines produce.

The five-year project is supported by the Ministry of Business, Innovation and Employment (MBIE) Endeavour Fund. Lincoln University Associate Professor Dr Amber Parker said being able to accurately predict yield estimation could be a massive shift for the industry. Greater accuracy would allow growers and winemakers to better prepare for harvest. Currently, a yield estimation within 5 to 10% is considered very good, but still leaves considerable room for variation. The autonomous robot estimates yield by creating a 3D scan with the exact number of flower structures on the vines. Every few weeks, the robot traverses Lincoln University's vineyard, scanning the vines where viticulturalists manually collect data for comparison.

During 2024, a second robot was deployed to a Marlborough commercial vineyard and will be a part of the first full season of testing.

Collaboration aims to develop technologies in agriculture

Six new Lincoln University scholarships aim to help land-based industries make better use of developing technologies. The Tait Foundation Scholarship Programme, co-funded by the Tait Foundation and the Tait Contel Charitable Trust, will support three undergraduate students, two research Master's degrees and one PhD across any discipline at the University. The only requirement is that students' study or research must focus on the convergence of land-based issues and emerging radio and wireless technologies.

Lincoln University Senior Lecturer Dr Crile Doscher, who is involved with the programme, says there are many areas in the land-based industries which can be improved upon in telecommunications.

This programme will enable students to push these technologies further and contribute to the overall knowledge of their fields. Communications technology is relevant to every industry; for agriculture, a significant challenge is keeping up with technological advancements and adopting them to rural areas.

Bringing greater discussion around plastics in our lives

An annual event held at and sponsored by Lincoln University, Kim Hill Hot Topic, discussed 'Plastic - how do we live with it' in 2024. Well-known radio personality Kim Hill led a panel of experts discussing issues related to plastic, including problems associated with our overuse of plastic and its adverse impacts on ocean life. The discussion also examined issues related to the true importance of plastic, our capacity to reduce consumption and the methods of recycling currently in use. Panellists at this event included Rob Wilson, Operations Manager at Eco Central, Rachel Barker, CEO of Plastics New Zealand, Professor Ian Shaw from the University of Canterbury and Professor Gavin Lear from the University of Auckland.

Growing wool science capabilities in New Zealand

A five-year research project, awarded through the MBIE Endeavour Research Fund, 'Smart, functional, high-performing keratin structures for new biologically derived export products,' is examining how to develop keratin biopolymer products that capitalise on wool keratin's unique structure. The project, from Lincoln Agritech, a 100% owned subsidiary of Lincoln University, builds on its wool science capabilities to establish new, profitable markets for the wool industry. Lincoln Agritech Project Leader Dr Rob Kelly says the project aims to develop products for diverse markets, including those that control the release of microbes in soil, textile fibres superior to silk and associated garments, and ruminant boluses for controlling greenhouse gas emissions. Project research collaborators include Harvard University, the University of Auckland and AgResearch and has been established with the support of the Wool Research Organisation of New Zealand.

Demonstrating best-practice farming

In 2024, Lincoln University hosted the Global Dairy Farmers Congress on campus. The group comprised dairy farmers and dairy-related stakeholders from around the world who toured the University before joining Antoinette Archer, Partnership & Demonstration Lead from South Island Dairy Demonstration Centre (SIDDIC) at the Lincoln University Dairy Farm. Antoinette said it was an excellent opportunity to showcase New Zealand dairy farming and the leadership team overseeing the University's farms, which are demonstrating best-practice innovative farming practices, specifically in reducing our environmental footprint, focusing on animal welfare, and adopting a people-oriented system that provides future solutions for farmers.

Looking ahead to more sustainable food production

Delivering expert analysis, Lincoln University Faculty of Agribusiness and Commerce Business Development Manager Rob Reynish, says a transition to horticultural land-use away from livestock or forestry will not be easily achieved, but offers New Zealand's primary industry significant commercial and export-boosting opportunities. When horticultural crops are more profitable than livestock, the transition in land use can occur with funds from private equity and other sources, eliminating the need for taxpayer subsidies. Downstream processing will attract major international investors with expertise and funding; therefore, in Rob's view, it will not require significant government investment. New Zealand's sustainable advantage lies in the combination of its climate, diverse soil types and reliable water supplies. This advantage needs to be utilised to achieve greater recognition on the global stage, says Rob, by selecting horticultural options that maximise these benefits. In a climate-challenged world, safe and reliable food production offers a premium economic advantage, horticulture can contribute to this by transitioning the country away from its current emissions-affected livestock model.

Building more resilient coffee supply chains

Lincoln University's Dr Muhammad Umar conducted field research in Vietnam and China as part of an ongoing project exploring resilience and sustainability in coffee supply chains. Dr Umar's journey began in Dak Lak Province, Vietnam, where he spent five days engaging directly with coffee farmers, processors, roasters and local research institutes.

These discussions provided essential insights into sustainable practices and challenges specific to the Vietnamese coffee industry. Dr Umar then travelled to Yunnan Province, China, to study the Arabica coffee supply chain. In Pu'er, a prominent coffee-producing region, he collaborated with staff and students from Yunnan Agricultural University. The team conducted comprehensive assessments covering coffee planting, processing and sales, with a particular focus on resilience against climate change and sustainable practices at each stage.

This collaborative research involved visits to Munai and Nandao River coffee regions and engagements with industry stakeholders, including Sucofina, Ziyuan Coffee Factory and Meizi Coffee Manor. These visits highlighted innovative practices, such as advanced grower training, product quality management and the integration of cultural tourism with traditional coffee businesses. Associate Dean of the International College at Yunnan Agricultural University, Lu Yao, underscored the value of linking Lincoln University's research strengths with practical fieldwork in China, enhancing both institutions' capacity for impactful teaching and research.

SDG 10

Reduce inequality within and among countries

Māori researchers comment on indigenous data sovereignty

A Māori research duo Lincoln University's Professor Amanda Black and Professor Tahu Kukutai from the University of Waikato, have had their commentary on indigenous data sovereignty published in the prestigious international journal *Science*. In the article, they discuss the importance of non-human genomic data being held in the same esteem as human genomic data, using the draft genome of the little bush moa (*Anomalopteryx didiformis*) as an example. The pair share that researchers have recently recognised Māori as the kaitiaki of the little bush moa by entering the draft genome sequence data into the Aotearoa Genomic Data Repository (AGDR), followed soon after by depositing the sequence in the open-access GenBank. This example illustrates the difficulty Indigenous peoples face in controlling non-human genomic research data, even when the scientists involved have good intentions. Indigenous customs and beliefs consider human interactions with rivers, mountains, flora and fauna to be just as important as interpersonal connections, due to the intrinsic interconnectedness between all living and non-living entities. It therefore makes sense that human and non-human genome data from Indigenous sources receive similar care.

Award for paper on Indigenous peoples and accounting

Lincoln University's Dr Vidwan Mohini's co-authored a paper on Sir Henare Ngata, the first Māori accountant in New Zealand, which was awarded Best Paper on Indigenous Peoples and Accounting at the 2024 Australasian Centre for Social and Environmental Accounting Research. The theme for the conference was 'Creating Communities: Accounting for, with, to, of, despite, or beyond'. Dr Mohini's paper documents how Sir Hēnare Ngata combined Māori culture, practices, and beliefs with Māori land law to support Māori in navigating

land development, business financial requirements and policymaking, while incorporating Anglocentric accounting practices. Sir Hēnare demonstrated that accounting knowledge supports Indigenous individuals, businesses and communities in growing and securing their futures within a society based on Anglocentric laws. These insights could help address the current underrepresentation of Indigenous people in the accounting profession.

Continuing commitment to the rainbow community

Lincoln University has a long-standing commitment to ensuring that all LGBTQIA+ (rainbow) individuals have the freedom to be safe on campus. The University encourages everyone to actively support the rainbow community and build towards a more inclusive and diverse community. The Pride Walk was once again held on campus in 2024 to acknowledge and celebrate the two rainbow crossings at the University. Organised by Lincoln's LGBTQIA+ student group, SPACE, the colourful event began with a walk from Calder Dive rainbow crossing, concluding near the first rainbow crossing installed at Lincoln University near Forbes Lawn. The annual Pride Walk forms part of the Pride Pledge, which sees Lincoln University committed to ensuring that rainbow people are visible and celebrated on campus.

Sharing ideas on inequality and development in rural Asia

Lincoln University's Professor Wanglin Ma co-organised the International Virtual Conference on 'Inequality and Development in Rural Asia', collaborating with the Asian Development Bank Institute (ADBI), Tokyo, Japan. The conference was organised based on papers collected from the Special Issue of the *Review of Development Economics* journal, in which Professor Ma serves as a leading guest editor. Eighteen authors from around the world presented their papers at the conference, each followed by a 10-minute discussion led by experts in the chosen field and a five-minute interactive discussion with other conference participants. Associate Professor Nazmun Ratna and Dr Kathryn Bicknell actively contributed to the conference, serving as the Session Chair and Professional Discussant. The event encouraged knowledge sharing in the areas of inequality and development, while also promoting Lincoln University's expertise in this area of research.

International students encourage diversity on campus

Lincoln University has continued to welcome increasing numbers of international students on campus since reopening its borders after the COVID-19 pandemic. In 2024, there was a significant increase in international students attending, with 1,593 enrolments, a 42% rise from 2023. This figure shows the University is now back at its pre-COVID levels for international student enrolments, with 1,592 enrolments in 2019. The nationality of international students is broad, with the top five countries being China, India, Japan, the Republic of Korea and the United States of America.

SDG 11

Make cities and human settlements inclusive, safe, resilient and sustainable

Sustainability Fund supports local projects

Lincoln University's Sustainability Fund supports the development of campus or community-based sustainability initiatives, allocating funds from the 5% sustainability surcharge applied to all University air travel bookings. In 2024, the first round of funding was allocated to different projects, including a grant for a 10-person cohort of Lincoln University soil scientists to take a low-carbon path to attend the New Zealand Society of Soil Science and Soil Science Australia Joint Conference (NZSSS). This low-carbon path reduced the greenhouse gas emissions by 82% compared to the same journey taken by air travel.

Sustainability Week received funding to host various events around campus, including promoting sustainable transport options and planting 100 native seedlings. A panel discussion was held focusing on the University's progress towards its emission reduction targets and achieving its sustainability goals.

Project WineCycle also received funding to turn the waste product from the winemaking process into valuable garden fertiliser. This saw the construction of a composting facility for grape marc, with the compost later removed and applied as fertiliser around the vineyards and other horticultural activities on campus. The WineCycle project also developed online lecture materials to support the teaching of sustainable winemaking and showcased the composting initiative to visiting wine industry professionals.

Engaging campus life in sustainable practices

Supported by Lincoln University's Sustainability Fund, Sustainability Week is held annually on campus to promote participation in sustainable activities within people's everyday lives. The 2024 Sustainability Week was organised by the Lincoln University Students' Association, Lincoln Environmental Sustainability Society and Sustainability Action Group for the Environment (SAGE).

The event was run by students and staff who recognised the importance of this event.

Lincoln University Senior Tutor in the Department of Environmental Management John Gould, a leading member of SAGE, says he is seeing an improvement each year in the uptake of sustainable practices across campus. This year, over 100 native seedlings, donated by Lincoln University's Field Research Centre and Travis Wetland Trust, were planted on campus by 40 enthusiastic staff and student volunteers. Dr Colin Meurk supervised the planting and shared his knowledge about New Zealand's native trees and local biodiversity.

A strong focus of Sustainability Week is highlighting alternative ways to travel using sustainable modes of transport. Whether walking, carpooling, driving an EV, taking a bus, riding a bike or Ebike, around 120 sustainable commuters were treated to a free pancake breakfast. Free bike servicing was also provided on campus, with 22 bikes being repaired or serviced.

Encouraging active participation in sustainability activities

The Sustainability Action Group for the Environment (SAGE) was active on campus in 2024, hosting numerous activities to address a range of sustainability issues. These included native tree planting to encourage biodiversity and carbon sequestration, promoting various sustainable transport options, organising Sustainability Week in August, and educating all on campus about topical sustainability issues through a series of seminars. SAGE is actively supporting Lincoln University's goal of achieving carbon neutrality by 2030.

Waimarie receives both national and international recognition

Lincoln University's Waimarie Science Facility won the South Island Science Facility People Awards - Preformance Building Technologies Excellence in Sustainability Award in 2024. The awards celebrate the outstanding contributions of industry leaders shaping the future of New Zealand's built environment. The Property Council New Zealand says the award was given to the Waimarie Science Facility Project Team because the building addresses one of the most pressing global challenges: sustainable food and resource production. The project team, comprising Lincoln University, Te Taumutu Rūnanga, Warren and Mahoney, BECA, and others, delivered a 9,500 m² facility that prioritises sustainability, from carbon reduction to water efficiency. The judges praised the project's positive impact on humans and its impressive integration of cultural values.

The Waimarie Science Facility received other accolades in 2024 in recognition of its exemplary innovation. The building was named the best education building in the Higher Education and Research category at the prestigious World Architecture Festival Awards 2024 in Singapore. Other awards included Building Nations (Excellence in Innovation), INDE Awards Asia Pacific (Best Learning Space) and NZ Commercial Project Awards (National Category winner – Education).

Lincoln University Vice-Chancellor, Professor Grant Edwards, says Waimarie's presence on campus has significantly enhanced its environment, and the building's award wins underscore its central role in the University's growing profile and reputation. The building also contributes to Lincoln University's vision of being an exemplar of sustainable practices in the land-based sector, as well as its commitment to achieving carbon neutrality by 2030 and carbon zero by 2050.

Hill Country Sheep Scene by artist Don McAra

Engaging students in real-life projects

The Faculty of Environment, Society and Design hosted Lincoln University alumni Phillip Millar (Land Development Project Manager) and Xoë Tay (Landscape Architect) from Selwyn District Council on campus to discuss student engagement and research opportunities arising from the development of a new district park planned on the outskirts of Rolleston. The Selwyn District Council has secured land to transform into a large-scale, multi-use public park, accommodating the needs of the rapidly growing Selwyn community. The first stage of this new park will be approximately 35 hectares in size, with works expected to commence in 2025/2026 after the master plan for the new park is completed. Members of staff from across the faculty discussed a range of opportunities for undergraduate, postgraduate and research students to contribute to a real-life project located near the University.

Art collection for all to enjoy

Lincoln University's Art Collection contains over 300 paintings, prints, sculptures and ceramics. Many of the artworks are available for free public viewing in foyers, corridors and outdoor spaces, or online, along with a downloadable campus guide to 10 key artworks, allowing for self-guided tours. Lincoln University also houses one of the largest entomology collections in New Zealand, with some of the collection available for online viewing. The collections curator can be contacted for free tours, popular with community and school groups. In 2024, Millie Galbraith, Art Curator at Lincoln University, created an engaging and relevant video series featuring academic staff and their connection to a specific piece within the University's art collection. In each video, a staff member discusses a favourite piece of artwork, sharing its significance and relevance to their teaching.

Supporting the future of community gardens

The 2nd Community Gardens Research Symposium brought together various stakeholders and partners to discuss their vision for urban agriculture and community gardens in New Zealand. Delegates from academia, Crown Research Institutes, local governance, NGOs and the wider community attended the event at Lincoln University's School of Landscape Architecture. The symposium was co-convened by Lincoln's Dr Andreas Wesener and the University of Canterbury's Dr Matt Morris, providing an opportunity for discussions on current academic research and related projects on community gardens in New Zealand. Discussions on the day covered the purpose, strengths, weaknesses and challenges facing community gardens and how research can support them.

Uncovering how housing and food production can co-exist

Farming for Good, a research collection aimed at better understanding the ways people connect to food and agriculture, was launched in 2024 by Our Land and Water Toitū te Whenua, Toiora te Wai. Farming for Good collection explores five perspectives on building trust and connection in food and farming. One of the research projects is The Peri-Urban Potential project led by Dr Shannon Davis from Lincoln University. The project explores how landscapes for both people and production can prosper within peri-urban settings through innovative spatial design. Dr Davis discussed this research on The Conversation, sharing that population growth and housing shortages mean urban expansion often encroaches on rural productive land, a concern for local food security. The edges of cities – the 'peri-urban' zone – are crucial for urban resilience. Apart from food, they supply ecosystem services such as flood and stormwater mitigation, cooling and climate regulation, carbon storage, waste treatment and recreation. The conversion of peri-urban agricultural land for urban expansion unwittingly undermines the very life support on which city dwellers depend. Dr Davis explores opportunities arising from the coexistence of food production and housing within peri-urban zones, including the development of five land-use design concepts aimed at addressing the peri-urban squeeze using Christchurch as an example.

PHOTO: Jon Sullivan

Low-flammability plant directory aids plant choices

Fire and Emergency New Zealand's new tool, the plant flammability directory, is utilising research from Lincoln University's Associate Professor Tim Curran on plant flammability. The online directory offers property owners and landscape architects a convenient way to search for low-flammability plant options that help mitigate fire risk on properties. The directory holds information on up to 470 species and is the result of Associate Professor Curran's research using a plant BBQ, which is used to test and measure the flammability of plants, understanding how long it takes for vegetation to ignite. He says the plant directory is an ideal reference point for people living in fire-prone areas or anyone concerned about a fire hazard and looking for suitable plant species to grow.

Creation of Burns Forest on campus

Following the demolition of the Burns Building on Lincoln University's campus, a biodiverse landscape that links the University campus with the Lincoln township has been planted. The area features a shared pedestrian and cycle pathway, providing easy access to the town centre as well as reciprocal access for the broader Lincoln community to campus facilities. The Burns Forest, as it is named, features a biodiverse range of native plants that were eco-sourced, with many grown in the campus glasshouses under the supervision of Pauline Murphy, Horticulture Research Area Manager, and Brent Richards, Senior Tutor, both from the Faculty of Agriculture and Life Sciences.

SDG 12

Ensure sustainable consumption and production patterns

Research on mitigating nitrate losses recognised

Associate Professor Racheal Bryant from Lincoln University has been recognised for her work on minimising the environmental impact of dairy farming by being awarded the 2024 McMeekan Memorial Award by the New Zealand Society of Animal Production (NZSAP). Associate Professor Bryant teaches ruminant nutrition and pasture agronomy while researching practical solutions for improving sustainable practices on farms, particularly in reducing nitrate leaching. To discover new ways of mitigating nitrate losses in dairy systems, her research developed nutritional management strategies that focused on forages and herbs. In 2018, Associate Professor Bryant established the Dairy Futures Living Laboratory at Lincoln University's Research Dairy Farm to encourage collaboration with industry and allow students to see science being implemented on a working farm first-hand.

Enhancing native biodiversity on farmland

On The Conversation, Lincoln University Postdoctoral Fellow in Biodiversity Elizabeth Elliot Noe and Professor Anita Wreford, along with Senior Lecturer from the University of Waikato Ottilie Stolte, shared their research findings on the experiences, values and priorities New Zealand dairy farmers have for their land. In the study, farmers on 14 dairy farms were interviewed in the Waikato and Canterbury. While dairy farmers have many values and priorities, limited time, resources and energy, some farmers are choosing to plant hedgerows, riparian plantings and shade trees to enhance native biodiversity that is otherwise lost when land is cleared for farming. Some study participants said they would trade off some profit for other values, such as improving animal welfare and minimising some negative environmental consequences of dairy farming.

While many participants discussed barriers to planting natives, these barriers were considered surmountable by farmers who felt it was essential to incorporate native biodiversity into their farm management. For them, planting natives was an integral part of running a sustainable dairy farm.

Sustainable practices in action on farm

Lincoln University hosted the 25th South Island Dairy Event in 2024 with attendees from across the dairy industry. The conference began with a visit to two of the University's demonstration dairy farms to learn about the current research being conducted. The main conference comprised of workshops covering people (managing high performing teams and health, safety, and wellbeing), environment (driver of nitrogen loss to water, winter grazing systems, irrigation and water use efficiency), animals (building a resilient cow for the future and creating value of non-replacement stock) and business (succession planning, contracts and preparing for natural disasters) with over 400 people in attendance. These workshops focused on improving the efficiency and productivity of dairy farming along with implementing sustainable practices on-farm. Keynote speakers included Jeremy Hill from Fonterra, who spoke about current research and development, Cameron Bagrie, an independent economist, who shared his views on New Zealand's economic environment, particularly on the primary sector, and Siobhan O'Malley, farmer and founder of Hemprino NZ and Meat the Need.

Seed technology course keeps industry up to date

Lincoln University hosted the 2024 Seed Technology short course, an annual course led by Professor John Hampton, Adjunct Professor Phil Rolston and Dr Aung Myo Thant, covering seed-related research and current management issues with both agricultural and vegetable seed crops, as well as sharing updates in plant breeding. Participants included industry leaders in the seed industry, along with Lincoln University postgraduate students representing 10 countries. The course covers seed production to postharvest technology, along with practical skills for seed quality testing. Additionally, the participants visited commercial seed companies and seed production sites in New Zealand, including seed laboratories, field visits, seed cleaning facilities and seed storage sites.

Food waste initiatives on campus

During 2024, 14.88t of food waste was generated on Lincoln University's campus, along with 19.63t of green waste. On campus, 32.8t of plastic was recycled, along with 7.8t of cardboard, which contributed to a total of 27.35% of the total waste being recycled in 2024. The University continues to introduce and streamline processes implemented to minimise food waste from food preparation. The Lincoln University catering team actively manages food waste across all catering areas, including cafeterias, event catering and student dining, to create greater efficiencies in food distribution on campus. To aid in reducing and managing food waste on campus, the University is developing a Waste Reduction Strategy.

Steering towards more climate-resilient land use

Lincoln University's Centre of Excellence - Transformative Agribusiness held an event on campus, drawing on international best practice and national insights from researchers, policymakers and industry to assess the feasibility of developing climate-resilient food and fibre systems in New Zealand. There are significant opportunities for the food and fibre sector to increase production to meet global demand; however, environmental impacts threaten to maintain the current level of productivity, making it challenging to consider further growth. This poses a significant conundrum for those within the sector: whether significant export growth can be achieved while meeting the ambitious targets for reducing greenhouse gas emissions. To help evaluate the challenges and opportunities available to New Zealand's food and fibre sector, the Global and Local Approaches to Climate-Resilient Land event featured European speakers Ada Ignaciuk (OECD) and Katarzyna Zawalinska (IRWiR, Polish Academy of Science). From a New Zealand perspective, Alison Bentley (Tikitere Farm) and Angela Clifford (Eat New Zealand) shared their views on the importance of creating local markets. At the same time, Mark Fitzpatrick (The Aotearoa Circle) and Cerasela Stancu (Envirostrat) discussed policy at a national level.

Manuals aid informed farming decisions

As part of its role as a land-based specialist university, Lincoln helps address the needs of the food and fibre industries. Since the 1960s, the Farm Technical and Financial Manuals have been produced by Lincoln University to assist tertiary students, farmers and agribusiness consultants in making informed decisions as part of their planning processes. High demand for the yearly publications continues with the information now published as the Financial Budget Manual and Farm Technical Manual. They offer unbiased knowledge on New Zealand agriculture, encompassing environmental planning and analysis tools, carbon pricing, land use decisions, succession planning, and agricultural markets and pricing. To assist with farm accounts, the Financial Budget Manual outlines budgeting and cost considerations, as well as various enterprise profitability and taxation considerations. Compiled with the general practitioner in mind, The Farm Technical Manual provides comprehensive data including information on livestock management, pastures, crops, forage crops, soils, fertilisers and irrigation.

SDG 13

Take urgent action to combat climate change and its impacts

Climate change and wine flavours

In an article published on The Conversation, Lincoln University Professor of Microbiology Stephen On and Senior Researcher at Landcare Research Dr Manpreet K. Dhami, share that the consequences of climate change inevitably include the production of food and beverages, including wine. In collaboration with Greystone Wines, an organic winemaker in North Canterbury, researchers investigated how microbial ecosystems (yeasts, bacteria and fungi) in organic winemaking differed between vintages. Samples taken from the 2018 vintage contained certain organisms that seemed to be completely absent in the 2021 vintage and vice versa.

Using publicly available climate data on humidity, temperature and rainfall to model climatic differences, researchers determined that temperature and humidity are key factors in influencing the composition of different microbial populations. The average rainfall during each of the production periods was also very different.

For the New Zealand and international wine industries, these findings suggest that changes in microbial populations during winemaking are associated with variations in climatic factors. It is therefore essential to understand the full extent of climate change's impacts on winemaking to better prepare the industry.

Climate change and biodiversity

Master of International Nature Conservation student Leonie Kock from Lincoln University published a journal article discussing the importance of considering the Earth's biodiversity when looking at the impact of climate change. She notes that more common conservative models used to understand the effects of climate change on a species often lack specific information and can lead to unrealistic projections.

A study by Urban and colleagues, including Dr William Godsoe from Lincoln University, examined how to enhance the accuracy of biodiversity predictions in the context of climate change.

They found that including six biological factors would improve the accuracy of models, though again, this data is lacking for most species. It is therefore challenging to make more accurate predictions. Several strategies can be employed to compensate for this data deficiency, such as modelling the future of keystone species, those with a more critical impact on their environment than others. Alternatively, researchers could focus on species that are supposedly more sensitive to climate change than others, as protecting these species may also benefit others.

Journal welcomes Lincoln professor on board

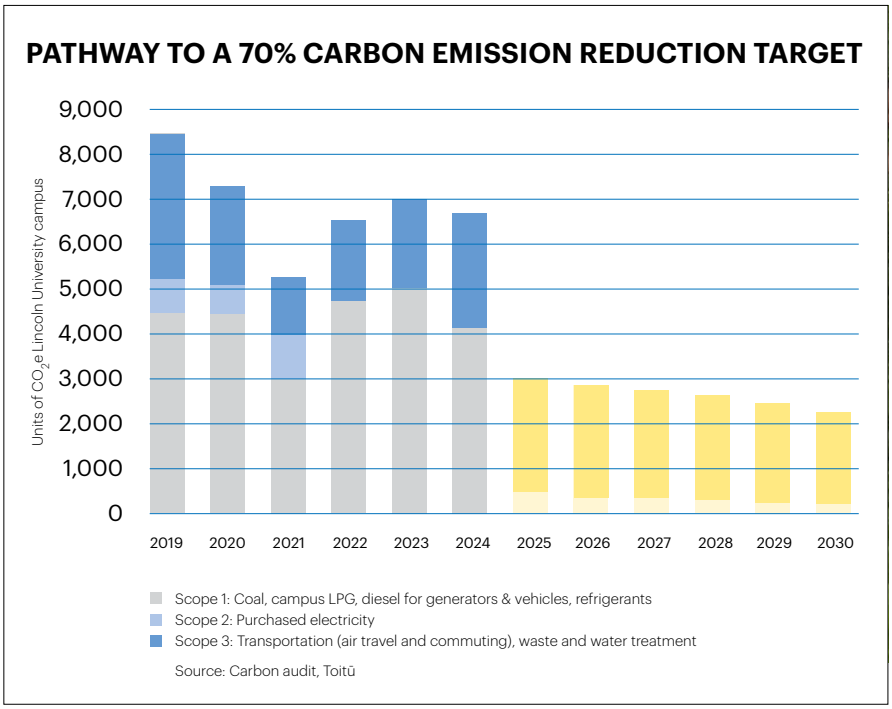
Professor Wanglin Ma from Lincoln University was appointed as an Advisory Board Member of the Mitigation and Adaptation Strategies for Global Change journal, focused on scientific, engineering, socio-economic and policy responses to environmental change. The journal is Q1-rated in ecology and Q2-rated in global and planetary change at the Scimago JCR quartile ranking. The journal aims to provide integrated perspectives and analysis of environmental, economic, and energy topics, addressing timely issues in these areas and serving as a forum for the development, testing, and implementation of solutions. It contributes to real-time policy analysis and development at national and international levels.

The journal also aims to address several of the United Nations Sustainable Development Goals (SDGs). Professor Ma welcomes submissions from colleagues and postgraduate students at Lincoln to contribute to scientific research in mitigating the effects of climate change.

Advising government on severe weather event recovery

Associate Professor Hamish Rennie of Planning and Environmental Management at Lincoln University is a member of the Severe Weather Event Recovery Review Panel. The panel was established through the Severe Weather Emergency Recovery Legislation Act 2023 (SWERLA) to advise New Zealand Government Ministers in response to Cyclone Gabrielle. SWERLA facilitates the recovery from natural disasters by enabling existing legislation to be relaxed or operate more flexibly through Orders-In-Council, which override, amend or temporarily replace legislation.

The panel is appointed to provide expert technical advice and scrutiny of the draft orders in Council, and to offer recommendations. In 2024, Associate Professor Rennie, as part of the panel, was given the Severe Weather Emergency (Hawke's Bay Rural Recovery Works) Order 2024 to review under section 16 of the Severe Weather Emergency Recovery Legislation Act 2023. The panel then provided recommendations on the draft Order for sending to the Minister for Emergency Management and Recovery and the Minister for the Environment.



Reducing carbon emissions on campus

Reducing carbon emissions and contributing to a sustainable future remain the focus of Lincoln University, as demonstrated by the total carbon emissions reduction from 7,019 tCO_2e in 2023 to 6,715tCO_2e in 2024.

The University also achieved Toitū Envirocare carbon reduce certification again in 2024 as in other years - 2019, 2021, 2022 and 2023. The framework enables the University to benchmark and measure its carbon emissions, identifying areas where progress has been made and where improvements are needed. Other sustainability initiatives by Lincoln University include increasing the proportion of EVs in the vehicle fleet, from 27% in 2023 to 33% in 2024.

Student volunteers lend a hand for flood relief

Ten students who volunteer through Lincoln University's Handy Landys club swapped study sessions for shovels during their exam break, helping farms impacted by severe flooding in South Otago. Handy Landys Executive Member Eibhlin Lynch said the trip was a "no-brainer" after the severe weather events, and the volunteers find witnessing the difference they're making in the farmers' lives and easing some of their stress immensely fulfilling. Local Owaka sheep and beef farmer Mark Shepherd described their help as a massive relief after his property's stream turned into a river, flooding approximately 50 hectares.
Over the five days, the Handy Landys worked across farms from Toko Mouth to Mokoreta, mainly clearing debris and repairing fences. The trip was made possible with the support of Lincoln University Students' Association, Otago Regional Council, Rural Support, the Ministry for Primary Industries and Telford.

PHOTO: Otago Daily Times

Innovative negative greenhouse gas emissions technology

Associate Professor Peter Almond from Lincoln University, along with two other co-authors, wrote the technical paper *An inventory methodology for enhanced rock weathering*, having received funding from The Greenhouse Gas Inventory Research Fund through the Ministry of Primary Industries (MPI). The fund aims to enhance the reporting of greenhouse gas emissions from agriculture, forestry, and other land uses by supporting ongoing research. The project reviewed the fundamentals of Enhanced Rock Weathering (ERW) as a potential negative emissions technology applicable to agriculture and outlines a draft inventory methodology for ERW, including a gap analysis and a spatial analysis of potential rock resources in New Zealand. ERW is based on the CO_2-consuming process of carbonic acid weathering of silicate minerals and the enhancement of this process by widespread, targeted application of ground rock material to agricultural land as a surface amendment. As an outcome of the work, the researchers proposed that New Zealand adopt an ERW greenhouse gas inventory methodology for agricultural liming emissions.

Insights into climate vulnerability and adaptation

Hosted throughout the year and open to the public, Lincoln University's Excellence Series Events showcase the leadership and impactful applied research conducted at the University. In 2024, Professor Tim Smith presented his research on climate change and its ongoing impacts, which continue to have a dramatic effect on communities, leaving some vulnerable. He discussed how populations can adapt to build resilience, an issue of increasing urgency. Professor Smith shared examples of the complex interplay between social-ecological vulnerability, drawing on research from the Mekong Delta, Australia and the Pacific. He also discussed the responses to reduce risk and implications for long-term resilience of communities and the systems that support them. Through these examples, Professor Smith offered insights into likely future vulnerabilities and strategies for effective adaptation.

SDG 14

Conserve and sustainably use the oceans, sea and marine resources for sustainable development

Understanding public values in coastal biosecurity

In the *Journal of Environmental Science & Policy*, Professor Chad Hewitt from Lincoln University co-authored the article, *Critical coastal values impacted by marine bioinvasions: What the public value about marine and coastal areas and what is at stake?* The research examined the values the public holds towards coastal areas and which values would potentially be impacted by non-indigenous marine species (NIMS) and subsequent management actions. By doing so, policymakers will be able to better predict social responses to marine biosecurity interventions. A sample of 1,001 New Zealanders were surveyed to identify what the public values in coastal areas and locations that were either value-rich or vulnerable to the impacts of NIMS and/or management actions.

The survey also examined socio-demographic patterns in the public's valuation of beaches and coastal areas. The findings highlight the diverse values people hold for marine and coastal areas, varying by gender, educational background, respondents' residential city sizes and the relative location between respondents' hometowns and their favourite beaches. Recognising these demographic patterns can inform marine biosecurity risk and intervention communication strategies.

Framework encourages greater stakeholder engagement

In *Marine Policy*, Professor Chad Hewitt from Lincoln University co-authored the article, *A holistic marine biosecurity risk framework that is inclusive of social, cultural, economic and ecological values*. The article presents a structured seven-step marine biosecurity risk framework to systematically assess the ecological, economic, social and cultural impacts of non-indigenous marine species, encouraging stakeholder engagement and promoting inclusive decision-making. This is an alternative to conventional risk assessment tools, which often fail to comprehensively evaluate these risks together, leading to stakeholder dissatisfaction, conflicts and poor biosecurity outcomes. The new framework supports the integration of diverse perspectives and audience-centred communication plans, facilitating informed and equitable decisions while standardising data examination. This aids in addressing ecological, economic, social and cultural integrity amidst threats from non-indigenous marine species.

Encouraging greater community input into coastal governance

Lincoln University's Associate Professor Hamish Rennie co-authored the article, *Facilitating the Ecosystem-Based Management Transition in Aotearoa New Zealand*, in the *Journal of the Royal Society of New Zealand*. The researchers examined coastal and marine governance processes in Kaikōura between the early 2000s and 2022 and found that its governance arrangements split into two distinct phases: the first is characterised by bottom-up decision-making, from which an ecosystem-based management (EBM) approach to decision-making emerged, and the second is characterised by top-down decision-making. Results suggest that although benefits arise from taking a top-down approach to marine and coastal governance, these can come at the cost of community engagement and community ownership over decision-making. Researchers propose that, to transition to EBM more easily, Marine Spatial Planning (MSP) can be used as a tool. Though researchers found that adopting a top-down MSP approach to governance can exclude some EBM principles, MSP can support the implementation of EBM principles if sufficient attention is given to developing institutions and processes that prioritise local decision-making and support ongoing engagement.

Advising government on marine farms legislation

Lincoln University's Associate Professor of Planning and Environmental Management, Hamish Rennie, sent a submission on the Resource Management (Extended Duration of Coastal Permits for Marine Farms) Amendment Bill to the Government. His submission offers his expert view on the proposed extension of duration of the coastal permits for marine aquaculture citing that, besides for Wainui Spat Farms, there are sound reasons not to extend the duration of the permits, including moral hazard, industry efficiency, integrity of regulatory and planning process, efficiency of coastal management and planning, coherence of legislation and recognition of existing rights. He also suggested that the Bill include a requirement for the Tasman District Council to introduce a plan change to address the landscape and natural character values of Wainui Bay by early 2025.

Sharing the need for coastal transformation

In the book *Being Algae: Transformations in Water, Plants,* chapter 13 *Seaweed as the Denizens of the New Commons in the Anthropocene* is co-authored by Lincoln University's Dr. Soo Jung Ryu.

The environmental humanities book encompasses the many aspects of algae across the sciences, humanities and arts. In Dr. Ryu's chapter, the authors critique current coastal urban development models, emphasising their inadequacy in handling future water issues due to climate change and the resulting degradation of coastal ecosystems. The health of our coastal ecosystems is of vital importance for the coastal cities that depend on them.

To protect them, the authors suggest shifting the perspective from trying to tame water as part of urban coastal development models.

As critical infrastructures retreat to higher ground, waterfront spaces will transform to integrate the water into the urban realm better. This will allow citizens to coexist with their marine neighbours, like seaweed. Restoration projects, such as the Gyldensteen coastal lagoon restoration, have demonstrated that nature will return, with different species of seaweed thriving after six years, highlighting the resilience of coastal ecosystems. Seaweed has the potential to play a crucial role as a connector between various actors (human and non-human, urban planners and city developers, marine biologists and politicians) to facilitate a collective effort in finding creative and alternative ways to encompass more restorative actions in coastal areas.

SDG 15

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss

Encouraging tree health through agrichemical alternatives

A Lincoln University-led project is utilising bioactive molecules from microorganisms to combat pathogens, thereby developing alternatives to agrichemicals to promote tree health and help mitigate climate change. The project, 'Unlocking the potential of microbial bioactive compounds to promote forest health', is led by Lincoln University Senior Research Officer Dr Artemio Mendoza-Mendoza and includes forestry expert Dr Helen Whelan. Currently, copper fungicides are used to fight pine pathogens, presenting potential environmental and human health costs. The new products under development would offer an alternative to agrichemicals with bioactive molecules providing an attractive alternative for fighting tree diseases such as kauri dieback. The project proposes coating the molecules onto seeds and spraying them onto existing trees. Plantation trials will be monitored for two years after planting takes place on the West Coast.

Project tackles plastic problem in conservation

Predator-control operations across New Zealand rely on single-use plastics, a concern addressed by Lincoln University PhD student Katie Pitt. Her research highlighted the extent of the problem and proposed practical solutions. Currently, over 96,000 single-use plastic chew cards are purchased and used each year to monitor mammalian pest species by collecting tooth mark impressions. At 5g each, that's a substantial amount of corflute plastic placed into at-risk ecosystems. Through her PhD research, Katie estimated the amount of microplastic left behind after monitoring operations. Trials conducted across various habitats in New Zealand revealed that approximately 15% of the plastic deployed ends up as microplastic residue. Katie's research then identified a promising alternative to plastic chew cards, made of recycled wood pulp. The wood-pulp cards are not only more cost-effective but also environmentally sustainable, as they biodegrade without causing harm.

The final stage of Katie's research involved a social survey targeting key stakeholders in the New Zealand conservation sector. The aim was to understand the views on integrating sustainable pest mammal monitoring tools into their operations. An overwhelming number of respondents agreed that shifting towards sustainable options was the optimum next step, provided the tools work as well as the traditional ones.

Local conservation efforts recognised with award

Lincoln University PhD student, Friederike Espinoza, has been spending her free time planting natives and tending to ecosystems around Christchurch and Banks Peninsula. Her efforts were recognised at the Waitaha International Student Awards where she was presented with the Community Engagement Award, which honours an international student who has been actively engaged with the local community. Friederike has been working with different conservation organisations on the weekends to plant natives throughout Christchurch and Banks Peninsula, as well as weeding non-natives that would hamper growth. She started volunteering as a way to learn more about New Zealand's native plants.

Utilising technology and community engagement to protect native birds

The battle against introduced pests in New Zealand has been ongoing, with the introduction of technology and the use of species-specific target tools being most effective. Lincoln University's Professor James Ross has conducted extensive research, primarily focusing on the three target predators: possums, stoats and rats. He says offshore islands are no longer a viable solution for re-homing native birds, as the land area totals only 30,000 hectares and the habitat does not match that of mainland New Zealand. Instead, Professor Ross says the public needs to be informed about how dire the situation is and educated on predator control and the various tools used. Engaging with the community has been hugely successful through the Predator Free 2050 programme, as exemplified by Zealandia Te Māra a Tāne, Wellington's wildlife sanctuary.

To inform the public about the gains in biodiversity and native bird populations, Professor Ross says continued funding is needed to quantify these gains and share them with the public. Currently, the focus is on pest removal with few resources for monitoring outcomes. Achieving outcomes, such as a 300% increase in kaka numbers on Waiheke Island, is thanks to the success of the Predator Free 2050 programme and the significant advancements in trapping technology. Recent developments in trapping are cost-effective, with lures easily attached to traps. In recent research, by Pest Free Banks Peninsula, Professor Ross and researchers tested lures in Banks Peninsula in areas with high and low possum populations. The trials showed audiovisual and social lures used in a trap were significantly more effective than the non-lured sites, doubling the number of possums caught.

Reducing the impact of invasive species on national parks

There is a growing push internationally to reduce the introduction and establishment of invasive alien species in countries. Managing risks often becomes more challenging beyond international borders. Lincoln University's Distinguished Professor Philip Hulme investigated the visitation patterns of international tourists to New Zealand's national parks to better understand the risks associated with their movements around the country.

Analysing the movements of international tourists to New Zealand pre and post-COVID, Professor Hulme found that different nationalities pose different risks. The most surprising finding was that biosecurity concerns and associated tourists differ pre- and post-border. At the border, Asian tourists, who may be less aware of our biosecurity rules, are often viewed as posing a high biosecurity risk. Post-border, British and European tourists are most likely to camp and stay overnight in national parks. They, therefore, pose a much greater risk of bringing invasive species into these protected areas. To help manage these risks, Professor Hulme says greater education is necessary to help tourists understand the risks they may bring to national parks. He also believes it is fair for overseas visitors to contribute to the costs of managing biosecurity risks through an international visitor levy and entry fees to national parks.

Enhancing local biodiversity knowledge

Curator of Lincoln University's Entomology Research Collection, John Marris and postgraduate student, Will Frost, hosted a visit to the collection by a group from the Christchurch City Council's Regional Parks Port Hills and Banks Peninsula Biodiversity teams. The group is responsible for a wide range of biodiversity work in the region, including weed and vertebrate pest control, as well as ecological restoration. Their two-hour visit aimed to enhance their knowledge and understanding of New Zealand's insect biodiversity. John provided an overview of the collection, while Will spoke about his Master's research on the ecology and genetics of the magpie moth.

Groundbreaking programme addresses skills shortage

A strong demand for more leaders to manage New Zealand's parks has prompted the launch of Lincoln University's Master of Parks Management. This is in response to a call from the New Zealand Parks Leaders Forum (PLF) to address an urgent skills shortage in the sector, providing social, cultural, environmental and business contexts for parks management. Associate Professors Emma Stewart and Stephen Espiner, who co-designed the qualification, say it is the first of its kind in the Southern Hemisphere and builds on Lincoln University's long history of teaching parks and recreation programmes. The interdisciplinary programme encompasses visitor management, conservation biology, wildlife management, environmental policy and planning, Māori resource management, tourism and outdoor recreation.

Fast-track approvals of infrastructure projects detrimental to biodiversity

Lincoln University Associate Professor of Ecology Tim Curran co-authored an article on The Conversation discussing the reforms to New Zealand's environmental laws. The current coalition government has introduced a bill to fast-track consenting process for projects deemed to be of national or regional significance. The Fast-track Approvals Bill would take precedence over several current environmental laws and give government ministers the power to bypass existing approval processes. Leaders of ten scientific societies that conduct biodiversity research in New Zealand have called on the government to slow down the pace of reform. They warn that decision-making criteria are weighted towards development, not environmental protection or sustainable resource use, and undermine New Zealand's obligations to protect the country's unique and threatened biodiversity.

SDG 16

Promote peaceful and inclusive societies for all and build effective, accountable and inclusive institutions at all levels

Advocate for environmental and social justice recognised

Every year, Lincoln University recognises the activities of a member of the academic staff who has most notably contributed to Lincoln University's role as a critic and conscience of society. In 2024, Professor Amanda Black received the Critic and Conscience of Society Award for her exceptional level of independent, expert commentary on national or global issues that affect societies and future generations.

Professor Amanda Black, Director of Bioprotection Aotearoa, is nationally and internationally recognised for her efforts in protecting New Zealand's taonga species and their ecosystems. During 2024, Professor Black was frequently called upon in local media to comment on nationally important topics. She advocates for the inclusion of Māori rights and interests, which lie within her research expertise.

In 2024, Professor Black advocated for kaupapa that support and protect indigenous knowledge in general, and Māori rights and interests more specifically. Notably, she co-authored a policy forum article in the prestigious journal *Science*, providing an evidence-based response to debates that have raged following efforts to ensure that Mātauraka Māori is given equal value to other bodies of knowledge in the school curriculum.

The article received considerable national and international attention, earning an Altmetric score of 785 and gaining over 2,000 shares on X (formerly Twitter). The article was shared by the US Science Envoy Dr Dawn Wright and was discussed in multiple blog posts by 'science defenders' such as Richard Dawkins. The article also led to Professor Black being profiled as an Indigenous scientist in the journal *Nature*.

Contributing to global cooperation in insolvency laws

Professor Christopher Gan, Chalerm Jaitang and Dr Zhaohua Li received media attention for their paper, *An Empirical Analysis of Private SMEs' Insolvency in Thailand Using Machine Learning*, which was profiled on the Singapore Global Restructuring Initiative (SGRI) blog. SGRI is a project launched by the Singapore Management University, with the support of the Ministry of Law, to promote cutting-edge research on restructuring and corporate insolvency law, while fostering cooperation between academics, practitioners, judges and policymakers from around the world. The advisory board is chaired by The Honourable Justice Kannan Ramesh from the Supreme Court of Singapore, with local and international board members.

Supporting Indigenous rights to decision-making

Dr Dyanna Jolly, Senior Lecturer from the Faculty of Environment, Society and Design at Lincoln University, co-authored a chapter in the book *Handbook of Public Participation in Impact Assessment* which focused on Indigenous peoples' inherent and internationally recognised rights by the United Nations Declaration on the Rights of Indigenous Peoples to grant or withhold their consent to decisions affecting their lands and communities. The authors emphasised that governments and authorities need to seek to co-design engagement and collaborative processes that respect Indigenous peoples. The chapter draws on insights and experiences from Canada and New Zealand to examine Indigenous engagement processes and the various ways in which Indigenous communities can participate in impact assessment processes.

Promoting inclusivity on campus

Students on campus at Lincoln University led a range of equity, diversity and inclusion initiatives in 2024, along with Respectfully Lincoln—the compulsory healthy relationships and consent workshop for all first-year students under the age of 21. The In Common Campaign supports people making connections across diverse groups, leading to more social inclusion and less racist behaviour. The campaign provides opportunities for people to value and connect with those from different cultural, ethnic and faith backgrounds. On campus, students developed a Lincoln University-specific quiz that aimed to identify connections between two people who haven't met before. Students and staff participated in the quiz workshops, and those who consented were paired together and had their photos taken as part of the campaign. At the Human Library event, students —both international and domestic—who have lived, travelled, or studied elsewhere in the world volunteered to share their stories with others on campus. Workshops were also run during 2024 including a neurodivergent-friendly budgeting workshop aimed at helping students prepare for 2025. Neurodivergent facilitators ran the sessions to ensure a safe space for neurodivergent students to attend and participate. They offered take-home resources and budgeting spreadsheets tailored to meet the needs of current students.

Recognising Indigenous knowledge in solving world problems

Lincoln University's Dr Ritodhi Chakraborty was one of a group of academics who formed The Knowledge Justice Collective, born out of conversations between Himalayan scholars on climate studies framework for the Himalayas. The collective seeks to advance meaningful engagements across knowledge systems by recognising Indigenous knowledge in solving world problems.

During 2024, the collective has been reviewing the Intergovernmental Project on Climate Change (IPCC) AR6 Report to identify how Indigenous peoples and Indigenous knowledge have been included. The IPCC is an organisation that sits under the United Nations Environmental Programme, and whose role is to assess, on a comprehensive, objective and transparent basis, the scientific, technical and socio-economic information relevant to understanding the scientific risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

Dr Chakraborty presented at the IPCC session: Indigeous content in the Sixth IPCC Assessment Report and its present and future implications to Indigenous peoples globally. At the session, participants discussed the importance of Indigenous-led voices and identified areas in need of transformation, including correcting the imbalance between mainstream Euro-Western science and Indigenous and local knowledge, as well as the need for greater funding in Indigenous knowledge research as standalone projects.

Challenging spaces to promote social harmony

Dr Soo Jung Ryu from Lincoln University co-edited the book *Building + Breaking: 8 Conversations about Spatial Justice*. The publication stems from conversations among architects, academics and activists on the role of architecture in social justice, exploring how race, religion and architecture can collectively influence the future of architecture. In chapter five, co-authored by Dr Ryu, *Breaking hygge – why race and racism keeps disappearing from discourse*, examines the Danish cultural concept of hygge, commonly associated with warmth and social harmony. While often celebrated as a positive social value, the authors demonstrate that hygge can be a subtle mechanism of exclusion—particularly in educational and architectural contexts—by enforcing conformity and suppressing expressions of racial, gendered and religious differences. The authors further explain that forces and spaces compel people and institutions to adhere to social cohesion, and institutional decisions can be shaped by the desire to preserve the status quo rather than a commitment to inclusion or justice. The chapter calls for hygge not to be used as a tool of avoidance and marginalisation but rather as a value that advocates for spatial practices to make room for dialogue and diversity.

Memorials hold cultural significance

In the book, *Global iconoclasm: Contesting "official" mnemonic landscapes*, Lincoln University's Professor Jacky Bowring, Dr Shannon Davis and post-graduate student Yeimy Paez, wrote the chapter, *Ballance and de Belalcázar: What Violent Action Against Two Statues in New Zealand and Colombia Reveals About the Political Power of Landscape*, sharing the narratives of two colonial figures, represented as memorial statues in New Zealand and Colombia.

In both countries, tensions have intensified in recent decades, resulting in violent actions against statues of historical figures representing colonial power, and by doing so, demonstrate the political potency of memorials and the impact that geographical and socio-cultural context has on public response. In New Zealand, the statue of John Ballance symbolises European colonial presence on Māori land and became the target of attacks by activists during the occupation of Pākaitore, Moutoa Gardens, Whanganui in 1995. In the 1940s, Colombia's officials chose the "Morro de Tulcán," a sacred site for Pubenenses Indians, to locate a statue of Spanish conquistador Sebastián de Belalcázar, rather than an Indigenous leader, Cacique Pube. In 2020, protesters pulled down the statue of de Belalcázar, a powerful symbol of oppression. These two case studies demonstrate that memorials serve as a form of protest, as they can hold immense significance to people.

SDG 17

Strengthen the means of implementation and revitalise the global partnership for sustainable development

Agreement deepens collaboration in food security

Lincoln University and Universiti Putra Malaysia (UPM) signed a Memorandum of Understanding (MoU), paving the way for enhanced research and academic collaboration between the two institutions. Building on previous agreements and shared interests, the new MoU will deepen the partnership between the two universities, with a particular focus on agriculture and food security. The agreement outlines key initiatives, including joint research activities, the exchange of teaching and research staff, research training for Master's and Doctoral students, and active participation in joint symposiums, syntheses and other academic meetings. For Lincoln University, the MoU offers researchers the opportunity to enhance their work and contribute to the strategic Food Security Blueprint developed by UPM.

Strengthening agricultural expertise and education

A new Memorandum of Understanding (MoU) between Lincoln University and the Korea Agency of Education, Promotion and Information Service in Food, Agriculture, Forestry and Fisheries (EPIS) will enhance skills and employability for Korean university students and professional farmers through specialised agricultural education programmes. The MoU features an exchange programme, with Lincoln University hosting Korean students, enabling them to explore innovations within New Zealand's agrifood system.

This initiative builds on Lincoln University's successful record in facilitating Prime Minister's Scholarships for Asia programmes in agriculture, further strengthening the University's resolve to establish relationships in the food and fibre sectors in both countries.

This new collaboration underscores the strong educational ties between New Zealand and Korea, further supported by the Korea-New Zealand Free Trade Agreement, which historically included education programmes for Korean students. The exchange programme will enhance student connections in the agribusiness field and align with the agricultural training and education initiatives outlined in the free trade agreement between New Zealand and South Korea.

Joint Institute with Huazhong Agricultural University launched

Lincoln University welcomed its inaugural cohort of students following the establishment of a new Joint Institute with Huazhong Agricultural University (HZAU) in China, which will be situated at HZAU in Wuhan, China. The institute offers four jointly awarded qualifications by Lincoln University and HZAU, including the Master of Environmental Management, Bachelor of Science Conservation and Ecology, Bachelor of Viticulture and Oenology and Bachelor of Commerce (Horticulture). Lincoln University Vice-Chancellor Professor Grant Edwards highlighted the Joint Institute as a significant milestone for the University, emphasising its role in expanding international partnerships and pathways to support student growth and global engagement. The Joint Institute of Huazhong Agricultural University will have a total enrolment of 1,000 students, though may be opportunities for growth, providing pathways for more postgraduate students from HZAU to Lincoln University. There is also a staff exchange component that fosters the global exchange of knowledge and innovation in the land-based sectors.

Tightening bonds with Tokyo University of Agriculture

Lincoln University signed a Memorandum of Understanding (MoU) with the Tokyo University of Agriculture. The University has campuses in Tokyo, as well as research farms located throughout the Tokyo region and in Hokkaido. A group of 15 students from Tokyo University of Agriculture visited Lincoln University in 2024, along with a range of food and fibre businesses, many of which are owned by Japanese interests and produce for the Japanese market in the off-season.

Land-based universities forge alliance

Lincoln University is the sole Euroleague for Life Sciences (ELLS) partner in New Zealand and one of the only two based outside Europe. ELLS is an alliance of land-based universities, each focusing on areas including natural resource management, agricultural and forestry sciences, life sciences, animal sciences, food sciences, agricultural economics, environmental sciences and rural development. This cohesion allows ELLS to promote the global exchange of knowledge and innovation through student exchanges, Master's programmes and summer school. Opportunities for students are available through all levels of university education, from undergraduate to post-graduate studies.

Appendix

Lincoln University Sustainability Report – Emissions and Measures

Since 2020, Lincoln University has made significant progress under its Sustainability Plan, recognising the need to adapt and lead by example in a world that is rapidly evolving with the impacts of climate change.

Below are the measures and targets set for Lincoln University as recorded in the Sustainability Report for 2024.

Sustainability Targets

		2019	2020	2021	2022	2023	2024	Data Source
Carbon Emissions	Lincoln University - Campus (tCO_2e)	8,555	7,313	5,234	6,599	7,019	**6,716**	*Toitu* Carbon Audit
	Lincoln University - Farms (tCO_2e)						**8,413**	*Toitu* Carbon Audit
	Emissions per Staff (tCO_2e/FTE)	12.8	12.2	9.8	12.1	12.2	**10.8**	*Toitu* Carbon Audit
	Emissions per Operating Revenue (tCO_2e/$Million)	67.4	61.9	44.0	52.2	50.7	**45.1**	*Toitu* Carbon Audit
	Air Travel (tCO_2e)	1,746	582	32	383	1,017	**1,216**	*Toitu* Carbon Audit
Air Travel	Emissions per Staff (tCO_2e/staff)	2.62	0.97	0.06	0.70	1.77	**1.96**	*Toitu* Carbon Audit
	Emissions per Student (tCO_2e/student)	0.53	0.18	0.01	0.11	0.23	**0.23**	*Toitu* Carbon Audit
Electricity	Usage per building floor area (kWh/m²)	120	113	125	130	152	**112**	*Toitu* Carbon Audit
Electric Vehicles	Proportion of EVs Fleet	N/A	N/A	N/A	15%	27%	**33%**	Sustainability Report
Sustainability Rankings	Green Metric	148th out of 619	51st out of 912	51st out of 956	52nd out of 1050	94th out of 1183	**85th out of 1477**	Green Metric Ranking
		Top 23.9%	Top 5.6%	Top 5.3%	Top 4.9%	Top 7.9%	**Top 5.7%**	Green Metric Ranking
	Impact Ranking	N/A	101-200th	101-200th	301-400th	201-300th	**101-200th**	THE Impact Ranking
Waste	Landfill (% of total waste)	81%	77%	79%	76%	69%	**73%**	Sustainability Report
	Recycling (% of total waste)	19%	23%	21%	24%	31%	**27%**	Sustainability Report
Water consumption	Consumption in litres (000)	N/A	N/A	N/A	154,434	194,839	**183,941**	Sustainability Report
Environmental Responsibility	Staff Positive Perception on the University's environmental responsibility	45%	N/A	63%	N/A	N/A	**67%**	*YourVoice* Survey

**** While air travel admissions increased in 2024 compared to 2023, it remains below target.**

Carbon Emissions

Category		2019	2020	2021	2022	2023	2024
Category 1: Direct emissions (tCO_2e)	Scope 1	4572	4524	3053	5005	4729	**4114**
Category 2: Indirect emissions from imported energy (location-based method*) (tCO_2e)	Scope 2	828	853	970	0	0	**0**
Category 2: Indirect emissions from imported energy (market-based method*) (tCO_2e)		0	0	0	0	0	**0**
Category 3: Indirect emissions from transportation (tCO_2e)	Scope 3	2940	1649	1082	1457	2027	**2364**
Category 4: Indirect emissions from products used by organisation (tCO_2e)		216	287	128	135	264	**238**
Category 5: Indirect emissions associated with the use of products from the organisation (tCO_2e)		0	0	0	2	0	**0**
Category 6: Indirect emissions from other sources (tCO_2e)		0	0	0	0	0	**0**
Total direct emissions (tCO_2e)		4572	4524	3053	5005	4729	**4114**
Total indirect emissions* (tCO_2e)		3983	2789	2181	1595	2290	**2602**
Total gross emissions* (tCO_2e)		8555	7313	5234	6599	7019	**6716**
Purchased emission reductions (tCO_2e)		0	0	0	0	0	**0**
Total net emissions (tCO_2e)		8555	7313	5234	6599	7019	**6716**

Waste

Waste Stream		2021	2022	2023	2024
		Weight (t)			
Landfill	General Waste	186.20	202.28	219.48	226.50
Recycled	Polystyrene	No Data	0.48	0.62	0.46
	Plastic Wrap	No Data	0.82	1.06	0.88
	Mixed Recyclables	10.77	9.32	11.54	32.80
	Scrap Metal	No Data	No Data	3.76	0.00
	Paper & Cardboard	No Data	No Data	3.84	4.87
	Cardboard	15.00	14.48	19.93	7.82
	Paper	25.19	28.12	20.07	5.68
	Ash	No Data	5.74	13.82	13.14
	Food Waste	No Data	No Data	No Data	14.88
	Green Waste	No Data	13.55	25.53	19.63

	2021		2022		2023		2024	
	Weight (t)	% total	Weight (t)	% total	Weight (t)	% total	Weight (t)	% total
Landfill Waste	186.2	78.51%	208.71	75.76%	219.48	68.66%	226.5	72.65%
Recycled Waste	50.97	21.49%	66.79	24.24%	100.17	31.34%	100.16	30.66%
Total Waste	237.17		275.5		319.65		326.66	

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Find out more at www.lincoln.ac.nz