BIOECONOMY
SCIENCE
INSTITUTE™

# Interim Statement of Core Purpose for the New Zealand Institute for Bioeconomy Science

## Purpose

Our purpose is to drive innovation and commercial outcomes in the bioeconomy, using research and technology to support enduring economic growth and resilience, a healthy environment and beneficial social outcomes for New Zealand.

The CRI will aggressively pursue opportunities to lift innovation, commercial outcomes, and adoption of advanced technology to drive economic growth across New Zealand.

## Outcomes

The CRI will fulfil its purpose through leadership in global science and innovation, the provision of research that benefits the economy, and the transfer of data, technology and knowledge in partnership with government, Māori, industry and communities to:

**Grow New Zealand's Bioeconomy** by supporting New Zealand's sectors and industries such as agriculture, horticulture, aquaculture, forestry, biotechnology and manufacturing and Māori enterprises with research to boost their productivity and profitability, support them growing and maintaining their market access and thereby helping create and maintain high-value jobs in the regions and the development of high value export products.

**Safeguard New Zealand's Economic and Biological Resilience** by helping measure, manage, mitigate and respond to the risks and threats to New Zealand's productive and natural ecosystems from pests and diseases. Build climate resilience through land use, mitigation and adaptation options that enable ways to build and maintain economic growth and resilience and ensure ecosystem services across catchments and sectors.

**Drive Innovation with Advanced Technologies** to support bioeconomy solutions including future food systems, novel food and bio-based products, waste, tools and technologies and integration of digital- and gene- technologies.

**Enable a Thriving Economy, Resilient Environment and Society** by supporting sustainable bio-based production systems alongside terrestrial ecosystem management that protects and enhances our biological heritage through important stewardship research.

**Enable science-informed policy, decision-making and reporting across the economy** by delivering science services and innovation that address national priorities, drive sustainable economic

growth, enable Te Tiriti while simultaneously supporting regulatory and governance priorities at international, national and local levels.

**Contribute to creating a more dynamic, effective and efficient SI&T** system for New Zealand by working collaboratively, including with other CRIs and universities

## Scope of Operations

**To achieve these outcomes, the New Zealand Institute for Bioeconomy Science will lead the following core research areas:**

Production Systems for Food and Bio-based Products

- Understanding, designing and enabling future sustainable production systems for high value food and bio-based products. Development of new food, beverage, ingredient, and biomaterial concepts with validated performance, nutrition and/or functionality, informed by global consumer trends. Safety, traceability and provenance of New Zealand foods and bio-based products.

Advanced Biomaterials and Bioenergy

- Develop biotechnology and advanced manufacturing technologies to create high-value products and sustainable materials from bioresources. Development and deployment of advanced bioenergy and biomaterials, sustainable packaging solutions. Wood processing and development of high value engineered wood products for the development of high-quality products and sustainable infrastructure.

Aquaculture and Seafood Technologies

- Aquaculture and seafood technologies for new production systems through to post-harvest technologies for enhanced resilience, productivity and high-value products from marine bioresources.

Plant and Animal Quality and Productivity

- Understanding and improving genetics, quality and productivity traits of plants, animals, fish, insects and microbes related to the bioeconomy sectors such as agriculture, aquaculture, horticulture, forage and native and exotic forestry.

Animal and Plant Health, Bioprotection and Biosecurity

- Plant and animal pest, pathogen, and disease prediction, identification, prevention, control, and elimination for existing and potential future threats (pre- and post-border). Development of new and improved tools and methodologies for terrestrial vertebrate and plant pest control.

Resilient Ecosystems and Land-Use

- Develop integrated land-use options across all scales for the terrestrial and built environments, including a focus on sustainable management of biodiversity and land resources. Improving our food production systems and nature estate through soil, freshwater, and nutrient understanding and modelling across landscapes and scales.

- Enhanced biodiversity and informed holistic land-use decision making from understanding natural and productive environments, pressures on biodiversity, monitoring methods and management approaches methods. Management and curation of valuable biological, terrestrial and soil collections, research databases, spatial and longitudinal datasets.

Climate Change mitigation and adaptation

- Climate Change mitigation, adaptation and measurement via new cultivars, adapted species, new and improved production practices and systems, microbial manipulation, decision support tools and measurement technologies.

People and Environment

- Tools and frameworks for resource management, decision-making, policy, governance, regulation, planning, Māori and community engagement, and strategic development of the bioeconomy. Integrated social science approaches and community engagement. Use mātauranga Māori alongside science for collaborative decision making and policy development.

**The New Zealand Institute for Bioeconomy Science will collaborate in the following areas:**

Food Safety and Health

- Interfaces between food safety and human health, including foodborne disease and risk management, contaminants in drinking-water, groundwater and freshwater systems, One Health approaches and cross-domain threats.

Natural Hazards and Risks

- Hazard impacts, multi hazard approaches and adverse events across sectors and emergency management.

Aquaculture, Seafood and Fisheries

- Integrated aquatic ecosystems and sustainability and environmental aspects of production.

Climate & Weather

- Interfaces between environmental modelling, climate change, weather and climate forecasts and land-use impacts.

Biosecurity

- Cross-domain and integrated approaches to biosecurity threats and biosystematics across environments, including pathogen detection, antimicrobial resistance monitoring, and biosafety through integrated One Health approaches.

Climate Change

- National mitigation, adaptation and resilience, including greenhouse gas emissions and carbon cycle, impacts on biodiversity across domains, climate-health research, environmental surveillance, and community resilience strategies.

Conservation, Biodiversity and Sustainable Ecosystem Services

- Development of national biodiversity and conservation approaches and environmental management.

Soil, Freshwater, and Nutrient Modelling

- Catchment management, water quality and environmental health, particularly in relation to rural and urban development.

Environmental Health and Risk Science

- Monitoring and risk assessment, as well as environmental reporting, across terrestrial, freshwater and marine environments; including Chemical, Biological, Radiological and Explosive (CBRE) threat detection, preparedness and response to protect population health and national security.

Technologies for Energy Efficiency and Security of Supply

- Collaboration on energy options, materials and infrastructure.

Social and Systems Science

- Integrated approaches to social science, community engagement and policy development; bridging biophysical and social science.

Science for Policy and Public Good

- Science for evidence-based and cross-domain policy, strategic foresight and international obligations.

Collections and Databases

- Biosystematics, data curation, data sharing, and infrastructure

Supercomputing and Advanced Technologies

- Digital infrastructure and data analytics including AI.
- A system-wide approach to development and use of advanced technologies, including via an Advanced Technology PRO

Vision Mātauranga

- Enabling the innovation potential of Māori knowledge, resources and people.

Building an effective SI&T system

- Approaches to knowledge transfer, commercialisation capability and infrastructure development.