



FINLAND



National Correspondent: Prof. Pirjo PELTONEN-SAINIO (mailto: pirjo.peltonen-sainio@luke.fi)

State or Federal Research Facilities, Institutes or Organisations

The primary task of state research institute, the main actors in sector research, is to acquire, produce and provide information as the basis for political decision-making and the development of society.

Ministry of Agriculture and Forestry

Natural Resources Institute Finland (LUKE)

<https://www.luke.fi/en/>

LUKE promotes bioeconomy and sustainable use of natural resources.

Profitable and Responsible Primary Production Research Programme

<https://www.luke.fi/en/research/profitable-and-responsible-primary-production/>

Primary production is in transition. The agricultural and fisheries industries are struggling with productivity, profitability and sustainability problems, and the most important issues in forestry are the adequacy of timber production and the sustainability of forest use. The challenge for the programme is to ensure the adequacy of primary production and to improve profitability in a sustainable way. The Programme provides solutions to diverse development and renewal of primary production to enable a lasting transition, and assessment and deployment of enabling technologies in primary production and its value chains.

Focus Areas

1. Technologies and Operational Models in Primary Production
2. Profitable Agriculture and Food System
3. Productive Forests

Circular Bioeconomy

<https://www.luke.fi/en/research/circular-bioeconomy/>

The global economy consumes more natural resources than is sustainable within the limits of the earth's carrying capacity. The need for and consumption of natural resources has been estimated to increase and the availability of raw materials to decline. The challenge for the programme is to use renewable resources and raw materials wisely and sustainably. The Programme provides solutions to the development of a bioeconomy based on renewable resources, with efficient and sustainable



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use of biomass and its compounds and nutrients, creating new business, and the enabling and promoting a circular bioeconomy based on the sustainable use and circulation of renewable resource

Focus Areas

1. Optimised Material Cycles
2. Added Value and New Products
3. Transition to Circular Bioeconomy
4. GenImpact – Renewing bioeconomy by generics and breeding
5. Policies – Natural resource and rural policies for societal transition

Climate Smart Carbon Cycle

<https://www.luke.fi/en/research/climate-smart-carbon-cycle/>

Healthy soil and growing biomass effectively sequester carbon and nutrients, but the land use sector also produces emissions to air, soil and water. The land use sector has an important role to play in mitigating climate change and halting the deterioration of the aquatic environment, which is further accelerated by land use and primary production. The challenge for the programme is to address the global climate crisis and its ecosystem impacts. The Programme provides solutions to ecologically, socially and economically sustainable climate change mitigation in the land use sector, and manage water impacts in the Baltic Sea catchment area.

Focus Areas

1. Productive Soil
2. Smart Land Use
3. Carbon Neutral Society

Adaptive and Resilient Bioeconomy

<https://www.luke.fi/en/research/adaptive-and-resilient-bioeconomy/>

Climate change, biodiversity loss, changes in the use of land and water (sea and inland waters), overexploitation of natural resources, pollution and other environmental upheavals and pandemics pose significant challenges to the well-being of nature and society. In addition to mitigating change, anticipating and adapting to it — preparing for and adapting to it — and the means to manage risk are essential. On the other hand, change can also open up positive opportunities. The challenge for the programme is a holistic understanding of the complex interactions between natural ecosystems, production systems, and society, and the ability to maintain resilience in changing conditions. The Programme provides solutions to: safeguard biodiversity and diverse ecosystem services, and opportunities for the future bioeconomy; the sustainable coordination of different sectoral and cross-sectoral needs and impacts in conflicting situations related to biodiversity, bioproduction and the use of natural resources; anticipating and tolerating, adapting to and coping with disturbances and risks in the operating environment and maintaining society's long-term viability and security of supply in changing circumstances; and seize and utilise the opportunities offered by change.

Focus Areas

1. Diversity and Co-existence
2. Ecosystem Services
3. Damage Agent Management
4. Resilient Society

Natural Resources Units

<https://www.luke.fi/en/luke-3/organization/units/>

1. Plant Production



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2. Forest Management
3. Water Quality Impacts
4. Soil Ecosystems
5. Plant Health
6. Forest Health and Biodiversity
7. Fisheries and Fish Resources
8. Migatory Fish and Regulated Rivers
9. Wildlife Ecology

Finnish Food Authority

<https://www.ruokavirasto.fi/en/>

The Finnish Food Authority works for the good of humans, animals and plants, supports the vitality of the agricultural sector, and develops and maintains information systems. It promotes, monitors and studies the safety and quality of food, the health and well-being of animals, plant health, fertiliser products, animal feeds and plant protection products used in agricultural and forestry production, and propagating materials.

Scientific Research

<https://www.ruokavirasto.fi/en/organisations/scientific-research/>

Scientific Research is one of the Finnish Food Authority's statutory duties and is linked to its duties and influence in society. Research results are used in the targetting of controls, legislative drafting and the development of international standards and instructions, as well as in risk assessment in various lines of business, including agriculture, the food industry and improving animal welfare.

Examples of Research Projects

1. [Human Health, Animal Health and Welfare, and Plant Health](#)
 - [Animal health and welfare](#)
 - Aquaculture innovations: recirculating water
 - Control of mycoplasma bovis infections in bovine reproductive technology
 - Controlling colibacillosis in the production chain of poultry
 - Crayfish plague diagnostics and epidemiology
 - Significance of bacteria in the occurrence of water moulds
 - Skin infection in the hoof area of dairy cattle – a new threat to dairy farming
 - Spread of salmonella to Finnish cattle and pig farms
 - Viral diseases relevant to the fish industry in Finland
 - [Impact of animals on human health](#)
 - Cryptosporidiosis – an emerging zoonosis from cattle
 - Vector-borne diseases and climate change
 - Rabies prevalence, prevention and inoculation
 - [Plant health](#)
 - Plant health risks associated with side streams from potato processing
 - Viruses in greenhouse production
2. [Food Safety](#)
 - Impact of pests on persistence and spearing of zoonotic bacteria on production farms
 - Presence and stability of viruses in the food production chain and in food industry processes
3. [Food Production and Vitality of Rural Areas](#)
 - Impact of extreme growth conditions on germination rate and vigour of seeds



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- Improved *Fusarium* management with new biocontrol concepts
- *Legionella* in growing media
- Optimising bio-based fertilisers in Agriculture – knowledgebase for new policies (LEX4BIO)
- Micro-plastics in agricultural land – emissions, effects, reduction
- Occurrence of *Legionella* bacteria in circular economy products
- Signs of prehistoric cultivation in Finland, in particular of the *Brassica* genus of plants

Risk Assessment

<https://www.ruokavirasto.fi/en/organisations/risk-assessment/>

Risk assessment is a scientific process which includes hazard identification, hazard characterisation, exposure assessment and risk characterisation. Extensive co-operation with industry, research and other authorities is central to risk assessment. The results of the risk assessments are used to support risk management and decision-making. Risk assessment is independent of risk management and decision-making. Risk assessment research links closely with the scientific research projects of the Authority

Functions of the Risk Assessment Unit

1. [Animals – infectious animal diseases](#)
2. Food
 - [Microbial risk assessment of food](#)
 - [Chemical risk assessment of food](#)
3. [Plants](#)

National Land Survey of Finland (NLS)

<https://www.maanmittauslaitos.fi/en>

Finnish Geospatial Research Institute (FGI)

<https://www.maanmittauslaitos.fi/en/research>

The FGI conducts innovative research and expert work within the field of spatial data, of a high and internationally renown quality.

Relevant FGI Research Projects

1. [Remote Sensing and Photogrammetry](#)
 - [ASPECT](#) – developing an autonomous UAV-based tree health analyser
 - [Density4Trees](#) – understanding wood density variation within and between trees
 - [Eranet Forest-ICT](#) – mapping forest health, species and forest fire
 - [Forest Cycles](#) – monitoring and understanding forest ecosystem cycles using high temporal and spatial resolution terrestrial laser scanning
 - [Opal Life](#) – mitigating greenhouse gas emissions from agriculture following the principle of sustainable intensification
 - [Quality4Trees](#) – automated tree quality surveying
 - [Scan4estEcosystem](#) – measuring spatiotemporal changes in forest ecosystems
 - [SILS](#) – upscaling of carbon intake and water balance models from individual trees to wider areas
 - [Tandem](#) – estimating forest resources and quality using automated methods and technologies



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Ministry of the Environment

Finnish Environment Institute (SYKE)

<https://www.syke.fi/en-US>

SYKE is a multidisciplinary research and expert institute. Its most important task is to solve society's most burning questions that have an impact on the environment to build a sustainable society. SYKE provides necessary information, multidisciplinary expertise and expert services for public and private decision-making.

SYKE Research & Development – Building solutions for a sustainable society

https://www.syke.fi/en-US/Research_Development

Research & Development at SYKE studies environmental changes on a broad scale and search for ways to solve environmental problems. It confronts significant environmental questions such as climate change and the sufficiency of natural resources. The interaction of nature, the environment, and people is at the epicentre of our work. We anticipate future events and we dare try new solutions. SYKE works in numerous domestic and international networks together with decision-makers, companies, local authorities, and citizens.

Areas of Research

1. [Climate Change](#)
2. [Consumption and Production](#)
3. [Circular Economy](#)
4. [Built Environment](#)
5. [Sea](#)
6. [Water](#)
7. [Nature](#)
8. [Protection of Environmental Information](#)

Universities/Higher Education Institutes

University of Helsinki

<https://www.helsinki.fi/en>

The University of Helsinki, a public research university, is the oldest and largest university in Finland, being founded in 1640 as the Royal Academy of Abo and moving to Helsinki in 1829. The university is bilingual, with teaching provided in both Finnish and Swedish, although teaching in English is extensive throughout the university, making English a *de facto* third language of instruction. Remaining true to its tradition ethos of the holistic combination of study and research, the university places a strong emphasis on high-quality teaching and research of the highest international standard and is member of prominent international university networks such as Europaeum, UNICA, the Utrecht Network, and is a founding member of the League of European Research Universities.

Faculty of Agriculture and Forestry

<https://www2.helsinki.fi/en/faculty-of-agriculture-and-forestry/about-the-faculty>



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The Faculty of Agriculture and Forestry is an expert in the responsible use of renewable natural resources both in Finland and worldwide. It focuses on the agricultural and forest sciences, food and nutrition, microbiology, as well as on economics and management. Its mission is to promote the sustainable use of renewable natural resources through scientific research and research-based teaching. It covers the full natural resource chain from farm to fork, the entire field of forest sciences from soil chemistry to marketing, as well as the environmental effects of related activities.

Departments

1. [Department of Agricultural Sciences](#)
 - Agrotechnology
 - Animal Science
 - Biotechnology
 - Environmental Soil Science
 - Plant Production Sciences
2. [Department of Economics and Management](#)
 - Agricultural Economics
 - Consumer Economics
 - Environmental and Resource Economics
 - Food Economics and Business Management
 - Marketing (value creation in marketing)
3. [Department of Food and Nutrition](#)
 - [Food Materials Science](#)
 - [Food Quality and Safety](#)
 - [Food quality and safety: lipids, vitamins and other bioactive compounds](#)
 - [Global issues in Local context](#)
 - [Grain technology](#)
 - [Molecular Dairy Microbiology](#)
 - Molecular Nutrition
4. [Department of Forest Sciences](#)
 - Forest ecology and management
 - [Forest economics and marketing](#)
5. [Department of Microbiology](#)
6. [Ruralia Institute](#)

Research Stations and other Faculty Units

1. Arboretum
2. [Hyttiälä Forestry Field Station](#) – Sciences meet in the middle of the boreal forest
3. [Viikin Opetus- ja tutkimustila](#)
4. [Viikki Plant Growth Facilities](#)

Faculty of Biological and Environmental Sciences

<https://www2.helsinki.fi/en/faculty-of-biological-and-environmental-sciences>

World-class research and education in environmental and life sciences, from molecules and cells to individuals and ecosystems



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Research Programmes

1. [Ecosystems and Environmental](#)
 - Climate change and arctic areas
 - The Baltic Sea: structure and function of marine and inland aquatic ecosystems; effects of climate change and eutrophication; environmental risks from fishing and marine traffic; changes in the drainage basin caused by humans
 - Urban Ecosystem
2. [Molecular and Integrative Biosciences](#)
3. [Organismal and Evolutionary Biology](#)
 - Organism and population levels of single-cell organisms, invertebrates, plants and vertebrates
 - Molecular biology, physiology, evolutionary genetics and genomics
 - Regulation of development and cell signalling in plants and animals, adaptation of organisms to stress and its effects on their survival in a changing climate

Faculty of Veterinary Medicine

<https://www2.helsinki.fi/en/faculty-of-veterinary-medicine>

The Faculty of Veterinary Medicine is the only institution offering veterinary education in Finland. It has a strong profile in animal health care and wellbeing as well as food safety.

Departments and Research Units

1. [Department of Food Hygiene and Environmental Health](#)
 - [Safe and sustainable meat chain](#)
 - [Food and environmental virology](#)
 - [Food control](#)
 - [Food hygiene and environmental health](#)
 - [Veterinary environmental hygiene \(Mirko Rossi Research Group\)](#)
2. [Department of Production Animal Medicine](#)
 - Andrology and genetic causes of calf mortality
 - Ethology and animal welfare
 - Plant oestrogen
 - Ruminant reproduction
 - Mastitis research
 - Infectious diseases in ruminants
 - Pig research
 - Equine reproduction research
3. [Department of Veterinary Bioscience](#)
 - Anatomy and development biology
 - Biochemistry
 - Physiology
 - Genetics
 - Microbiology and epidemiology
 - Pathology
 - Parasitology
4. [Research Centre for Animal Welfare](#)



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- Mind and emotions
 - Sleep and rest
 - Pain and sickness behaviours, health and welfare
 - Regulation and stakeholders perceptions
 - Housing and management
 - Welfare assessment
5. [Department of Equine and Small Animal Medicine](#)
 6. [Veterinary Teaching Hospital](#)

Aalto University

<https://www.aalto.fi/en>

Aalto University's purpose is to shape a sustainable future through high-quality research, excelling and making breakthroughs in and across science, art, technology and business. It aims to spark the game changers of tomorrow, and renew society with research-based knowledge, creativity and an entrepreneurial mindset. It incorporated the Helsinki University of Technology (TKK).

Department of Bioproducts and Biosystems

<https://www.aalto.fi/en/department-of-bioproducts-and-biosystems>

The Department of Bioproducts and Biosystems (Bio2) is at the forefront of forest products technologies and cutting-edge biotechnology.

Research Areas

1. Biobased Colloids and Materials
2. Biobased Materials Technology
3. Biochemistry
4. Biohybrid Materials
5. Biomolecular Materials
6. Biopolymer Chemistry and Engineering
7. Bioproduct Technology
8. Biorefineries
9. Lignin Chemistry
10. Protein Technology
11. Wood Chemistry
12. Wood Material Science and Technology
13. Wood Material Technology

Department of Electrical Engineering and Automation

<https://www.aalto.fi/en/department-of-electrical-engineering-and-automation>

The Department of Electrical Engineering and Automation brings together scientists and engineers from different fields of microsystems, electrical engineering and automation work to solve the most challenging scientific problems in the fields of energy and environment, and health and wellbeing.

Research Areas

1. Control, Robotics and Autonomous systems
 - [Autonomous systems](#) – semi-autonomous machines and autonomous mobile robots in agriculture and forestry



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Häme University of Applied Sciences (HAMK)

<https://www.hamk.fi/hame-university-of-applied-sciences/?lang=en>

Häme University of Applied Sciences' roots go back to 1840 when agricultural education began in Mustiala, and soon expanded to include forestry and horticulture. It has four research units carrying out applied research: HAMK Bio, HAMK Smart, HAMK Tech, HAMK Edu, of which HAMK Bio and HAMK Smart are the most relevant to agriculture, fisheries, forestry and food systems.

HAMK Bio – Sustainable Bioeconomy

<https://www.hamk.fi/research/hamk-bio/?lang=en>

HAMK Bio combines theoretical knowledge in bioeconomy with practical applications in real research environments. The knowledge created here is based on the needs of industry.

Research Areas

1. [Value from Biomasses](#)
2. [Smart Bioeconomy Solutions](#)
3. [Sustainable Built Environment](#)
4. [Regional Development](#)

HAMK Smart – Intelligent Services

<https://www.hamk.fi/research/hamk-smart/?lang=en>

Research Areas

1. [Digital Solutions in the Bioeconomy and Circular Economy](#)
2. [Digital Solutions and Platforms \(DISP\)](#)
 - Field Observatory: to bring farmers, researchers and decision makers together to explore different, effective farming activities to improve carbon sequestration
 - Digital Bale: to improve the monitoring and management of silage bales

HAMK Tech – Technology for the Future

<https://www.hamk.fi/research/hamk-tech/?lang=en>

JAMK University of Applied Sciences

<https://www.jamk.fi/fi/Etusivu/>

The goal of JAMK is to be an internationally recognised learning innovator and developer of competitiveness. Its basic mission is to provide higher education based on the requirements of working life, applied research and development work that serves polytechnic education and supports working life and regional development, and adult education to maintain and strengthen working life skills.

Areas of Research and Development

1. [Applied Research in Intelligent Agriculture](#) – Tarvaala Digital Innovation Centre for Intelligent Agriculture and Bioeconomy (AB SmartDIH)
2. [Smart Farming Applied Research](#)
3. [Bioeconomy](#)



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Savonia University of Applied Sciences

<https://www.savonia.fi/en/homepage/>

Savonia UAS is one of Finland's biggest and most versatile universities of applied science

School of Engineering and Technology

<https://www.savonia.fi/en/savonia-uas/schools/engineering-and-technology/>

Areas of Competence

1. Environmental Technology
 - Bio energy
 - Environmental protection
 - Waste management
 - Water safety

School of Natural Resources

<https://www.savonia.fi/en/savonia-uas/schools/natural-resources/>

The Savonia School of Natural Resources trains professionals for traditional, but rapidly evolving, fields. Its outlook to studies and research is pragmatic, versatile and strongly forward-looking.

Areas of Competence

1. Agriculture and rural industries
2. Rural development
3. Agricultural entrepreneurship development
4. Animal welfare
5. Food security

Research, Development and Innovation

<https://www.savonia.fi/en/rdi-projects/rdi-project-list/>

Relevant Projects

1. Animal Health and Economy
2. Study and Work Practice Agriculture and Food Safety
3. Farm 2030
4. Farm Safety Development
5. Insect Savo
6. International Farmer
7. JALAKA – Exercising and Grazing in Cattle Farms
8. Mapping the Potential of Biomethane to Farms in the Northern Savo Region
9. Pollution Services – Better yields and quality crops
10. Production Resilience from Grass
11. Thermal Imaging of Cattle

Seinäjoki University of Applied Sciences (SeAMK)

<https://www.seamk.fi/en/>



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SeAMK is a multidisciplinary non-profit government dependent higher education institution with a significant role in education and research, development and innovation in the South Ostrobothnia region in West Finland. It specialises in entrepreneurship, food and internationality.

School of Food and Agriculture

<https://www.seamk.fi/en/aboutus/faculties/school-of-food-and-agriculture/>

The School of Food and Agriculture has three fields of study, around food and food processes: agriculture and rural enterprises, food processing and biotechnology, and food and hospitality. The focus of its research and development focuses is food safety, sustainable agri-food systems, business management and economics in agri-food, and nutrition.

Areas of Competence and Research

1. Sustainable agri-food systems
2. Business management and economics in agri-food
3. Nutrition
4. [Sustainable Food System and Bioeconomy](#)
 - Promotion of the sustainable use of renewable resources
 - Adaptation to climate change and low carbon innovations
 - Reduction of food waste

University of Eastern Finland

<https://www.uef.fi/en>

The University of Eastern Finland is a recent establishment, formed by the merger of the University of Joensuu and the University of Kuopio. It has four faculties, of which the Faculty of Science and Forestry. It has a high standard of interdisciplinary research and education, responding to global challenges and building a sustainable future.

Faculty of Science and Forestry

<https://www.uef.fi/en/faculty-of-science-and-forestry>

Relevant Schools and Departments

1. [Department of Chemistry](#)
 - [Bio-organic chemistry](#)
2. [School of Forest Sciences](#)
 - <https://www.uef.fi/en/unit/school-of-forest-sciences/research-areas>
 - Forest mensuration, Information Technology and planning -
 - Forest management, soil sciences, ecology and health -
 - Forest economics, policy and foresight
 - Wood materials science, wood procurement and bioenergy systems
3. [Department of Environmental and Biological Sciences](#)
 - <https://www.uef.fi/en/unit/department-of-environmental-and-biological-sciences/research-areas>
 - Aquatic research
 - Water chemistry and microbiology
 - Aquatic ecology and behavioural ecology



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- Aquatic ecotoxicology
- Biology of environmental change
- Biogeochemistry
- Environmental ecology
- Environmental informatics
- Process informatics
- Animal physiology
- Hare research
- Plant ecophysiology
- Plant biology
- Tropical ecology and edible insects

South-Eastern Finland University of Applied Sciences (XAMK)

<https://www.xamk.fi/en/frontpage/>

XAMK was established at the beginning of 2017 when Kymenlaasko University of Applied Sciences and Mikkeli University of Applied Sciences merged. It is the fifth largest university of applied sciences in Finland, and is the largest university of applied sciences in Finland in terms of R&D activities carried out. Research is mostly applied research in close co-operation with companies, with a regional development slant.

Research and Development Activities

<https://www.xamk.fi/en/rdi/>

XAMK's continuously increasing RDI activities are mainly focused on Europe, the Baltic Sea Region and Russia. In collaboration with our international partners, we strive to solve the common challenges of the future. Its four focus areas feature national and international top expertise serving the needs of the largest companies in Finland and the export industry.

Forest, the Environment and Energy

<https://www.xamk.fi/en/forest-the-environment-and-energy-spearheads-of-competence/>

Forest, the environment and energy focus area researches and develops new products, production processes as well as measurement and monitoring solutions for the fields of bio-economy, circular economy and technology industry. The focus area expertise and laboratories excel in the fields of bio-product and fibre technology, wastewater purification, environmental safety, wood modification as well as energy technology.

1. New fibre products and processes
2. Forestry and wood construction
3. Electronics and materials
4. Environmental safety and circular economy
5. Renewable and efficient energy systems

Logistics and Seafaring

<https://www.xamk.fi/en/logistics-and-seafaring-spearheads-of-competence/>

1. Maritime safety and emergency management
 - Environmental effects of maritime transportation
 - Emission abatement technologies
 - Invasive species



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2. Sustainable port logistics

Sustainable Well-being

<https://www.xamk.fi/en/sustainable-wellbeing-spearheads-of-competence/>

1. Smart, user-centred food services
 - Improvements of food service processes
 - Technology, digital solutions and data in food services

University of Turku (UTU)

<https://www.utu.fi/en>

Relevant Schools and Departments

1. [Biodiversity and sustainability](#)
2. [Future technologies and digital society](#)
3. [Sea and maritime studies](#)

Åbo Akademi

<https://www.abo.fi/en/>

Åbo Akademi University is the Swedish-language multidisciplinary academic university in Finland. We contribute to society through general learning, education and new scientific knowledge.

With campuses in Turku and Vaasa, Åbo Akademi University offers internationally renowned research and education. Through cross-border collaboration, we serve as the gateway to Finland for the Nordic countries.

Relevant Schools and Departments

4. [Technologies for a sustainable future](#)
5. [The sea](#)

Other Organisations/Institutes

VTT

<https://www.vttresearch.com/en>

VTT is one of Europe's leading research institutions. It is owned by the Finnish state. Its task is to advance the utilisation and commercialisation of research and technology in commerce and society. Through scientific and technological means, it turns large global challenges into sustainable growth for businesses and society.



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Relevant VTT Research Projects

1. [Artificial intelligence and big data](#)
2. [Biotechnology](#)
3. [Circular economy](#)
4. [Climate action](#)
5. [Food production](#)