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# Southern Cross University Research Impact Clusters



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University**

At Southern Cross University, our research impact clusters identify four areas of focus: **Harvest to Health, ZeroWaste, Reefs and Oceans, & Catchments, Coasts and Communities.**

While our researchers are already making an impact locally, regionally and globally, these clusters enhance that impact, bringing together cross disciplinary expertise to solve complex research problems.

The clusters represent a targeted approach to a common goal – a better, safer, cleaner, more sustainable world.

## **Harvest to Health Impact Cluster**

Fundamental and applied research to enhance the sustainable production of functional foods and natural products through the entire supply chain to assess their potential to optimise human health and reduce the risk of disease.

Addresses the UN Sustainable Development Goals Zero Hunger and Good Health and Wellbeing



# Key Research Projects in the Harvest to Health Cluster



## Bees for Sustainable Livelihoods

This project supports profitable, productive and sustainable beekeeping for indigenous communities throughout the Indo-Pacific region.



## Quality Black rice

Southern Cross researchers are determining the drivers of nutritional quality in this superfood to enable future breeding of quality black rice cultivars for domestic production of high-value, sustainable, healthy black rice.



## New Coffee cultivars for Australia

Research as part of the World Coffee breeding program to identify new dwarf commercial cultivars that are adapted to the Australian coffee growing climates.



## Food security, rock phosphate and resilient farming

This project is researching ways to recycle biosolids using thermal treatment approaches, extracting and recycling valuable phosphorus before the waste goes into landfill.





## Zero Waste Impact Cluster

Bringing together research expertise in geochemistry, environmental science, engineering, business and education to develop solutions for our global waste problem. Our research addresses the barriers associated with integrating wastes into the circular economy, developing and implementing cutting-edge scientific, technical, social, economic and education-based solutions.

Addresses UN Sustainability Goals of: Climate Action; Life on Land; Clean water and sanitation; Responsible consumption and production; Sustainable Cities and Communities.

# Key Research Projects in the Zero Waste Cluster



## ReCirculator

Partnering with local industry to reduce waste while creating jobs and driving innovation. The ReCirculator project connects businesses in a circular economy ecosystem of cutting-edge technology.



## Transforming meat residue into agricultural soil.

Development of technology that can transform the organic residues from red meat processing into engineered hydrochars to improve plant growth, and actively mitigate greenhouse gas emissions.



## Woodchip bioreactors reducing fertiliser pollution

This project is trialing technology to reduce nitrogen pollution entering nearby waterways by as much as 85%.



## Marine plastic pollution

An international research partnership tackling marine plastic pollution. between Southern Cross University, the Pacific Islands Development Forum and the Federation of Indian Chambers of Commerce & Industry (FICCI).





## Reefs and Oceans Impact Cluster

Working with industry, government and communities, our Reefs and Oceans research is helping to leverage the ecological, environmental, economic, and cultural value of our precious marine environments.

Our world-renowned reef restoration research has led to the development of innovative and proven solutions for the restoration and protection of coral populations.

Addresses the UN Sustainability Goals of: Climate Action; Life Below Water.

# Key Research Projects in the Reefs and Oceans Cluster



## **Coral IVF**

SCU has pioneered a solution to mitigate the impacts of climate change on coral reefs using naturally occurring coral spawning to reseed and restore damaged reefs. The challenge now is to scale this success to larger reef areas including the Great Barrier Reef.



## **Cloud brightening**

Marine cloud brightening is a world-first technique which sees microscopic sea water droplets sprayed into the air, creating a plume of salt crystals. This interacts with clouds to reflect solar energy away from the reef waters when heat stress is at its maximum. This technology will reduce the severity of coral bleaching by cooling and shading the corals below.



## **Shark surveillance**

A technology-based marine study that develops drones for shark surveillance in collaboration with the NSW Department of Primary Industries. The research is focused on improving the detectability of sharks and delivering the machine learning tool to lifeguards and other beach authorities.





## Catchment, Coast and Community Impact Cluster

Impactful and engaged research for transformative environmental, social and economic change within catchments, coastal zones and their communities.

From carbon storage models and methane cycling in trees to pesticide run-off and mitigating the effects of fertilisers in our waterways, the cluster develops practical and innovative solutions to sustainable land and water management issues.

Addresses the UN Sustainable Development Goals: Clean Water and Sanitation; Climate Action; Life Below Water; Life on Land; Sustainable Cities and Communities.

# Key Research Projects in the Catchments, Coast and Communities Impact Cluster



## Blue carbon

Research from Southern Cross University's coastal biogeochemistry experts has contributed to scientific debate around the climate benefits of blue carbon and the development of carbon and methane budgets. Our researchers have also played a major role in the development of the world's first blue carbon accounting model (BlueCAM), adopted by the Australian Federal Government.



## Methane Cycling in Trees

Methane is an extremely potent greenhouse gas, but there are significant uncertainties as to where the methane originates from. Researchers at Southern Cross University are combining a range of techniques to unravel the plant and microbial community interactions involved in methane cycling in Australian forests.



## Flooding

The Coastal Biogeochemistry group, funded by ARC, are looking at the effects of extreme events such as floods on the aquatic biogeochemistry of intermittent coastal streams, tidal wetlands and inland dryland rivers. This will allow industry partners to translate the research into practical outcomes to better manage coastal ecosystems.



## Intensive horticulture and coastal catchments

Coffs coast waterways are bearing the brunt of a nitrogen double-whammy from fertilisers and recycled sewage. Remarkably in dry periods, though, the waterways can protect downstream habitats by removing much of the nitrogen naturally, Southern Cross University researchers have found.