



SDG 6 Clean Water and Sanitation

Overview

UQ demonstrates a strong commitment to SDG 6 through a comprehensive approach that spans campus operations, research, and community engagement.

As part of its Sustainability Strategy, UQ has implemented efficient water saving initiatives and water management practices to better understand and manage its water consumption and use across campuses.

Educational initiatives and partnerships extend UQ's impact beyond campus, offering training, research collaboration, and practical solutions for water conservation.

The University engages with local and international communities to improve water security, sanitation, and environmental health. Through innovation, policy development, and outreach, UQ contributes to sustainable water management and fosters a culture of responsible water use, aligning its efforts with global sustainability targets.

Progress made in 2024 towards SDG 6 is reported here with reference to the following domains and enablers from UQ's Strategic Plan 2022-2025:

- Learning and student experience
- Research and innovation
- Enriching our communities
- Our global profile
- Securing our future.

Related SDGs

- [SDG 2 Zero Hunger](#)
- [SDG 3 Good Health and Well-being](#)
- [SDG 7 Affordable and Clean Energy](#)
- [SDG 8 Decent Work and Economic Growth](#)
- [SDG 13 Climate Action](#)
- [SDG 14 Life Below Water](#).

Learning and student experience

UQ offers dedicated programs and courses in sustainability as well as many more programs and courses with embedded sustainability content and learning outcomes. Educating future leaders, scholars and professionals enables UQ to prepare students and equip staff to understand, address and solve sustainability challenges, including those involving securing and maintaining clean water and sanitation.

Curriculum

UQ offers a robust selection of programs focused on sustainable water management and planning, including undergraduate and postgraduate degrees in environmental management, engineering, and urban planning.

The [Master of Urban Water Engineering \(Professional\)](#) provides engineers with the integrated knowledge and skills required to grasp the whole urban water cycle and the linkages between its different aspects. This postgraduate degree is designed to develop students' technical expertise through advanced and master's level courses and provides the opportunity to select electives to complement their discipline. This knowledge will expertly prepare graduates with the necessary skills required to solve complex engineering challenges in a changing world. The trend towards urbanisation and associated water stress in modern cities is strengthening, and as urban centres become more densely populated this will not be reversed in the foreseeable future.

As part of the [Bachelor of Engineering \(Honours\)](#) UQ offers a [Water and Marine Engineering Major](#). This major equips students to use innovative monitoring and modelling techniques to design efficient, adaptable and sustainable waterways, coastlines and resilient infrastructure, including designing and building renewable hydropower and ocean energy systems essential to reducing carbon emissions and managing climate change. Students in this major learn how to protect large areas of inland flood plains, beaches, estuarine zones and coral reefs, leading Australia's efforts in developing promising locations for water resources, hydro-power and tidal and wave energy.

In addition to master's and bachelor degrees, UQ also provides a [Graduate Certificate in Engineering Science](#), with an [Urban Water Engineering Field of Study](#). This field of study provides engineers with the integrated knowledge and skills required to grasp the whole urban water cycle and the linkages between its different aspects. Graduates are equipped with the skills to design, optimise and manage the urban water infrastructure in the cities of the future.

Extra-curricular learning – Urban Design Challenge

The Centre for Water and Environmental Biotechnology hosted the [Urban Design Challenge](#) on 11 March 2024. This provided students with the opportunity to enrich their understanding of sustainable water and other resource management.

The event used workshops, interactive activities, field trips and group sessions with experts and leading academics to engage multidisciplinary teams of students to work together on a water and energy systems integration case study to improve sustainable city design and liveability. Key learning opportunities include being able to test and refine ideas through 40 hours of continuing professional development; knowledge and use of Cooperative Research Centre for Water Sensitive Cities analysis tools; and leveraging the expertise and understanding of different fields, including water, to solve real-life problems related to sustainability, urban growth, water and energy demand and resource efficiency.

Research and innovation

UQ seeks to deliver economic and social benefits to Queensland and Australia by leveraging its research expertise in a diverse range of fields, including those that contribute towards progress in SDG 6.

Water conservation and sanitation

UQ researchers have partnered with industry and government to develop novel methods and technologies that are supporting water sustainability, conservation, and sanitation across the country to benefit people, the economy, and the environment.

How we are achieving this

- **Biofilm-based solution for cost-effective high-quality drinking water.** In 2024 researchers from the Centre for Water and Environmental Biotechnology began an ARC funded project that proposes a novel biofilm-based approach for cost-effective drinking water treatment production. This addresses the challenge faced by Australian water facilities of managing the growth of cyanobacteria which are a known major cause of taste and odour compounds and cyanotoxins, and which are posing an increasing problem due to climate change complications. The approach of this research represents a simple retrofit to existing processes to drastically reduce the chemical dosing costs required and improve climate resilience while ensuring production of high-quality, safe drinking water.
- **Reducing toxins in wastewater for the economy, human health, and the environment.** UQ researchers partnered with Queensland Government-owned Urban Utilities, the Gold Coast City Council and South Australian Government-owned SA Water to develop a system to manage hydrogen sulphide in sewers, using smart algorithms to predict hydrogen sulphide buildup and deliver precise chemical doses to manage the issue. It is estimated that the technology can reduce chemical use by more than 40%. Other potential benefits include the extension of service life of sewer infrastructures, and a reduction in the need for frequent inspections and maintenance work in wastewater systems, all of which add to residential water bills. The control of corrosion and odour problems in sewer networks is also critical for water management and protecting human health and the environment. In 2024 this work won the Silver Project Innovation Award from the International Water Association. Improving sewer system efficiency and reducing chemical use support water conservation in urban infrastructure.
- **Capturing PFAS for cleaner water and better battery technology.** In 2024 researchers at UQ's Australian Institute for Bioengineering and Nanotechnology (AIBN) advanced PFAS remediation with a novel technology that can remove harmful "forever chemicals" from water so they can be used in renewable batteries. The filter contains a patented sorbent solution that uses an ion-exchange technique to isolate and remove PFAS particles as the water passes through. In addition, the captured chemicals are available to be repurposed to aid decarbonisation since they have excellent properties for use in the improvement of energy density, safety and cycling stability of batteries. Supported by Advance Queensland, the technology underwent pilot trials in Brisbane and the US, with the aim of demonstrating potential for scaling up in industrial settings.

- **Examining reported company commitments to water stewardship.** Researchers at UQ's Centre for Water in the Minerals Industry released a publication in 2024 exploring the scope of corporate water stewardship activities that mining companies report and reflect on in the context of the commitments to water stewardship that the International Council on Mining and Metals (ICMM) has incorporated into its framework for members. Findings include that reporting off-tenure activity relating to collaboration and providing water governance beyond the mine remains complex due to contradictions with the generally accepted role of government agencies in water governance. The research recommends refining the language in industry guidelines to encourage companies to contribute to or ensure internal water governance. These insights help clarify the role of mining companies in sustainable water management and encourage corporate cooperation in sustainable water governance and stewardship.

Protecting and restoring water-related ecosystems

UQ researchers are making progress towards SDG 6 through research that is helping to protect and restore water-related ecosystems in Queensland and Australia.

How we are achieving this

- **Reef Catchments Science Partnership.** UQ researchers continued to enhance public understanding of the impacts of pesticide toxicity to reef environments through the [Pesticide Reporting Portal](#) and [Pesticide Risk Metric Dashboard](#). These are part of the Reef Catchment Science Partnership, a data gathering collaboration with the Queensland Government. These freely available tools collect and measure data to help monitor and analyse land-based pesticide runoff affecting coastal waters, supporting sustainable management and conservation efforts.
- **Reducing Pesticides in Aquatic Ecosystems.** Researchers at the Faculty of Science continued the [Pesticide Projector](#) project in collaboration with Farmacist, Queensland Government, and Truii. The tool provides information to help users select pesticide active ingredients that are less harmful to plants and animals in waterways, therefore contributing to healthier and more resilient aquatic environments. The tool is available to all communities involved in the recommendation, purchase and application of pesticides to agricultural crops in Australia.
- **Impact of Flood Sediments on Moreton Bay's Ecosystem.** As part of a long-term research collaboration with Queensland Government-owned Urban Utilities and the Port of Brisbane, researchers from the School of Civil Engineering published [findings](#) in March 2024 assessing the impact of flood sediments on Moreton Bay. The study, conducted after the 2022 Brisbane River flood, revealed significant sediment deposition affecting 98% of the bay, reducing clean sand areas and increasing nutrient levels, contributing to the growth of a dead zone. This collaboration is vital for safeguarding Moreton Bay's ecosystem and informing global best practices for managing flood impacts and protecting marine ecosystems.
- **[Great Barrier Reef Catchment Loads Program](#).** In 2024 UQ secured \$3.6 million in funding from the Australian and Queensland governments to enhance water quality monitoring in the Great Barrier Reef catchments. This investment is a collaboration between UQ, James Cook University, and the Queensland Department of

Environment, Science and Innovation. It has tracked water quality since 2006 for freshwater, estuarine and marine ecosystems associated with the reef, where UQ has its Heron Island Research Station. The funding will enable the deployment of advanced monitoring technologies, analysis of samples from over 100 coastal sites, and real-time satellite reporting at more than 50 locations. It will also provide UQ environmental science students with opportunities for research projects and industry placements, fostering the next generation of reef scientists.

Enriching our communities

UQ supports efforts in the broader community to address water management and water usage. This includes providing educational opportunities for local communities to learn about water management as well as practical off-campus water conservation support and promotion of conscious water usage.

Water management educational opportunities

The [Centre for Water and Environmental Biotechnology](#) (ACWEB) is a world leading centre in water research and an emerging leader in environmental biotechnology. ACWEB has broad collaborative links to more than 100 different utilities, businesses, industry groups, research institutions, and educational facilities around Australia and the world. The Centre plays an active role in engaging with communities and professionals to address water management challenges. 2024 activities included:

- [Industry and Water Education \(IWES\) training courses](#). IWES ran training courses for environment and water industry professionals from 1-5 July. IWES was established over 40 years ago and its courses are taught by leading industry practitioners. They are designed to keep busy professionals on the cutting edge of the latest trends, technologies and practices.
- [International Water Association Nutrient Removal and Recovery \(IWA NRR\) Conference](#): Held from 17-21 November, this conference was a collaboration between UQ and Urban Utilities. The event invited scientists and practitioners to contribute their insights, knowledge and experiences in navigating wastewater treatment systems amid the evolving global landscape, serving as a vital platform for the exchange of ideas and the exploration of innovative solutions.
- [ACWEB Seminar Series](#). The Centre hosted a seminar series on various topics addressing water and environmental biotechnology. Sessions ranged from practical applications of wastewater treatment to the role of chlorination disinfection in antimicrobial resistance, and energy-efficient resource recovery from wastewater – all topics relevant to community water and environmental health.

Facilities and services

The Centre for Water and Environmental Biotechnology (ACWEB) offers a [range of services and facilities](#) to internal and external clients. These include:

- **The Analytical Services Laboratory (ASL)** offering routine services as well as adapting and developing new analytical methods around wastewater, surface water and drinking water to support researchers in their relevant research areas. Types of

analytes include nutrients, sulphur species, anions, greenhouse gases, total organic carbon, and metals and metalloids.

- **Methane potential and activity testing.** ACWEB is a key leader and developer of anaerobic biodegradability, activity and inhibition tests, offering independent testing to enable certainty in feasibility analysis. Ongoing testing of existing projects offers benchmarks to assess process efficiency and product quality.
- **Environmental Microbiology Laboratory (EML).** This is a fully equipped modern laboratory for molecular biology and the culturing of microorganisms, including facilities for manipulation and fingerprinting of DNA and various forms of enrichment and microbial culture techniques.

Our global profile

UQ seeks to have a positive impact not just locally and nationally, but also globally. Its research contributes towards maintaining safe, economically viable, and environmentally sustainable water supplies and ecosystems in the Asia–Pacific and beyond as part of helping to advance the UN’s SDGs and leveraging UQ’s development expertise to support capacity building.

How we are achieving this

- **Quantifying urban water security.** In collaboration with the Asian Development Bank (ADB), the International Water Centre, and other international partners, UQ’s ACWEB is involved in quantifying urban water security (water supply, sanitation, drainage, and affordability) across ADB’s 50 member countries. The data collected feeds the Asian Water Development Outlook (AWDO) analysis, report and database, which influence the Asia Pacific Water Forum and guides, including approximately \$4.5 billion in urban water infrastructure investment each year. In 2024 there was an increase in the number of countries reporting a safely managed water supply, as monitored through the Joint Monitoring Program. This work was also presented in the Indonesia and Pacific Islands Water Forum.
- **Smart water supply systems in arid zones.** In 2024 researchers from UQ’s Sustainable Minerals Institute (SMI) and SMI’s International Centre of Excellence in Chile (SMI-ICE-Chile) conducted research that aims to develop a water supply planning software, open to all interested parties, that can be used by the mining industry, government agencies, communities and other stakeholders to design an integrated, efficient water supply system while minimising supply costs and environmental impacts. Developed for the Atacama Region and funded by Mitsubishi Corporation Inversiones Limitada Chile (MCI), the tool facilitates collaborative understanding of the regional context, optimises and maps water supply networks, and evaluates the associated benefits based on economic, environmental and social performance criteria.
- **UQ’s GEF highlighted at International Water Conference under Water and Ocean SDGs.** The UQ team from the Coral Reef Rescue: Resilient Coral Reefs, Resilient Communities project, funded by the Global Environment Facility (GEF), participated in IWC10 in Uruguay, from 23-26 September 2024. UQ facilitated a conference clinic session focusing on conserving resilient coral reefs through national and inclusive

approaches. The session explored the establishment of National Hubs in countries such as Fiji and Indonesia, demonstrating how inclusive governance and multi-sectoral stakeholder engagement can enhance coral reef conservation efforts. The Coral Reef Rescue project aims to build capacity and solutions in 6 countries: Fiji, Solomon Islands, Indonesia, Philippines, Madagascar, and Tanzania, for the long-term survival of climate-resilient coral reef ecosystems and the communities dependent on them.

Securing our future

UQ recognises the deeply interconnected nature of water and sanitation, understanding that access to clean water and effective sanitation systems is not only essential for public health and wellbeing, but also plays a critical role in supporting sustainable development across environmental, social, and economic dimensions.

UQ actively works to implement initiatives throughout its operations. Examples include water-sensitive urban design (including native vegetation planting and stormwater capture systems) and the use of recycled water to enhance sustainability and reduce environmental impact across campus operations now and into the future.

Water consumption

Understanding and managing water consumption is central to UQ's Sustainability Strategy. While the University sources potable water primarily from local water authorities across its various sites or through specific contractual agreements with third-party providers, it has implemented a range of water-saving initiatives to reduce reliance on mains water and promote sustainable water use.

How we are achieving this

- rainwater harvesting systems installed across multiple campuses
- use of recycled water for non-potable applications such as landscape irrigation
- proactive leak detection and repair, ensuring that water losses are minimised
- operating a water monitoring system where over 500 water meters are read and reviewed monthly, and the data is used to identify anomalies, detect leaks early, and inform water efficiency improvements
- working towards further automation of its water monitoring and analysis to enhance efficiency and expand the reach of its water management efforts.

Water usage and care

UQ aims to achieve best practice in efficient water management and pilot new technologies demonstrating its leadership in sustainable and responsible use of resources.

How we are achieving this

- UQ aims to make it easy to avoid bottled water and single-use plastic. Water refill stations have been installed around the University, so that students, staff and visitors can make use of their re-usable water bottles and enjoy fresh water refills across campus.
- UQ integrates a comprehensive set of [Design Standards](#) into all design and construction projects. These standards are reviewed annually to ensure alignment with

best practice, regulatory requirements, and sustainability goals. They guide the planning and implementation of hydraulic infrastructure across UQ campuses, supporting the University's commitment to sustainable water management and resource efficiency by emphasising water-efficient design principles, including:

- rainwater harvesting systems and integration
 - high-efficiency fixtures to reduce water usage
 - water storage tanks for non-potable applications
 - advanced metering to support monitoring and leak detection.
- UQ manages its grounds seasonally and sustainably, adapting and aligning planting and gardening practices to the time of year and the weather conditions. UQ prioritises drought-tolerant, native, and low maintenance species. The University also undertakes a range of sustainable gardening steps, such as composting and re-using as much green waste as possible onsite, implementing sustainable weed management, and enacting water-saving and irrigation measures. These measures include using recycled water and harvested rainwater wherever possible to reduce mains water usage.
 - The St Lucia campus's iconic main lake has been redesigned to support a healthy and self-sustaining ecosystem, as part of the UQ lake and amphitheatre renewal project. An independent expert panel, convened by the International River Foundation and including [Associate Professor Badin Gibbes](#) from UQ's School of Civil Engineering, set out to improve the lake's health by creating a more natural system to support an abundance of aquatic plant life and provide a habitat for native fauna species. Construction is complete and the natural environment is beginning to establish. It is expected that some fauna will repopulate naturally, and flora will flourish over time.

Water reuse

UQ actively reuses water to support sustainability across its campuses. Recycled water is used for irrigation, while harvested rainwater is used in isolated sites for both irrigation and toilet flushing, reducing demand on potable water supplies.