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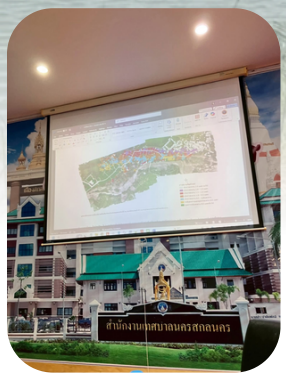
CLEAN WATER AND SANITATION

"CLEAN WATER AND SANITATION FOR ALL"















- FREE DRINKING WATER PROVIDED
- WATER-CONSCIOUS BUILDING STANDARDS
- WATER-CONSCIOUS PLANTING
- WATER REUSE
- PROMOTING CONSCIOUS WATER USAGE IN THE WIDER COMMUNITY

Clean Water and Sanitation to guarantee the availability of clean water and sanitation with sustainable management for everyone

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CLEAN WATER AND SANITATION

Policy and Commitment to SDG 6: Clean Water, Sakon Nakhon Rajabhat University, Fiscal Year 2025

Sakon Nakhon Rajabhat University (SNRU) sits in the Nong Han basin, home to one of the largest natural freshwater lakes in Northeast Thailand, in a province that faces both floods and droughts every year. The university advances SDG 6: Clean Water and Sanitation, along two main lines:

1. Sustainable water management on campus. Under its Green Office policy and its Energy Conservation and Environmental Policy, SNRU uses its campus as a living laboratory for water management.
   - Wastewater treatment: a biological aeration system (62 aeration units) treats 99,411.84 m^3 of building wastewater a year, and SNRU reports effluent quality monthly to the Pollution Control Department.
   - Water reuse: treated water passes through a constructed wetland and is reused for irrigation and green-space care, at 10,944 m^3 a year (11%).
   - Rainwater harvesting: campus reservoirs, including Nong Bak Dao, Nong Hai, and Nong Ya Sai, store rainwater and reduce flash-flood risk for neighboring communities.
   - Water efficiency: water-saving fixtures such as dual-flush toilets and sensor urinals.
   - Free drinking water: 100 free drinking water stations across campus, meeting Thai Industrial Standards for drinking water.
2. Research and outreach for community water security. The Nong Han Center of Excellence works with WWF Thailand on forums to conserve the Nong Han wetland. Other projects include:
   - Lam Oun River restoration: ecosystem restoration and awareness at Ban Phok Yai, Phanna Nikhom District.
   - SMART Water: flood and drought early warning in Mueang and Kusuman districts.
   - Solar-powered water for farmers: mobile solar water pump carts and automated water distribution systems for 18 farmer institutions.
   - Community tap-water filtration: Public health students teach communities simple tap-water filtration.

Free drinking water provided

1. SNRU sees access to clean, safe drinking water as a basic right for every student, staff member, and visitor. Every building has at least one free drinking water dispenser on every floor, with more than 100 stations across campus in teaching buildings, offices, dormitories, canteens, and activity areas. Everyone can get drinking water close at hand, free of charge.
2. The dispensers use high-quality filtration systems, and the water meets Thai Industrial Standards for drinking water. The university maintains them regularly, replacing filters, cleaning units, and testing water quality on a set schedule, so the water stays clean and safe.
3. Free drinking water across campus also supports SNRU's Green Office policy and 3R program. Students and staff are encouraged to refill their own cups and bottles instead of buying bottled water, which cuts single-use plastic waste, saves students money, and reduces the energy used to produce and transport bottled water. This reflects SNRU's commitment to a healthy, environmentally friendly campus and supports SDG Target 6.1 on safe drinking water for all.







Water-conscious building standards



1. SNRU sits in the Nong Han basin, in a province hit by both drought and floods every year, so every drop counts. The university aims to make all fixtures in its teaching and office buildings 100% water-efficient by 2031. This goal sits under its Green Office policy and its Energy Conservation and Environmental Policy, guided by the principle “use less, reuse, and use wisely.”
2. SNRU began by surveying fixtures in every building to set a baseline. The survey found 349 water-efficient fixtures out of 2,726 (12.80%). Urinals have made the most progress, with 262 of 324 (80.86%) already sensor-operated or low-flow. Toilets (2.55%) and taps (6.12%) have the most room to improve. These figures are both the university’s starting point and its roadmap.
3. Next, SNRU will:
4. Upgrade during renovation and maintenance: replace toilets with dual-flush models and taps with water-saving or sensor taps.
5. Set the standard for new work: require water-efficient fixtures in all new buildings and renovation projects.
6. Start with the busiest buildings: prioritize high-traffic buildings such as shared lecture halls and dormitories.
7. Track progress every year: update the fixture inventory and report the share of water-efficient fixtures.
8. Alongside this, SNRU reuses 10,944 m^3 of treated building wastewater a year for irrigation and stores rainwater in its Nong Bak Dao, Nong Hai and Nong Ya Sai reservoirs for non-drinking uses. This 100% goal is part of building a university that values every drop of water and supports SDG Target 6.4 on water-use efficiency.



SNRU uses nature to manage water across its landscape. The campus has several reservoirs and natural water bodies, including Nong Bak Dao, Nong Hai, and Nong Ya Sai. In the rainy season, they act as retention basins, slowing runoff and reducing the risk of flash floods on campus and in nearby communities. In the dry season, the stored water irrigates trees and green spaces. The shaded path around Nong Ya Sai is both a place to exercise and a natural area where rainwater soaks into the ground. For its green spaces, SNRU plants drought-tolerant trees suited to the local climate, such as golden shower (khun, Cassia fistula), rain tree (chamchuri, Samanea saman), and flame of the forest (thong kwao, Butea monosperma). They provide shade and have deep roots that keep the soil moist, so they need little watering. Part of the irrigation water comes from treated building wastewater, which flows through a constructed wetland and holding ponds before 10,944 m^3 a year is reused. This reduces mains water use for landscaping, supported by efficient sprinkler systems. As a result, the campus landscape does more than look good. It works as a water management system that stores rainwater, reduces flooding, saves mains water, and reuses treated water.



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Water-conscious planting

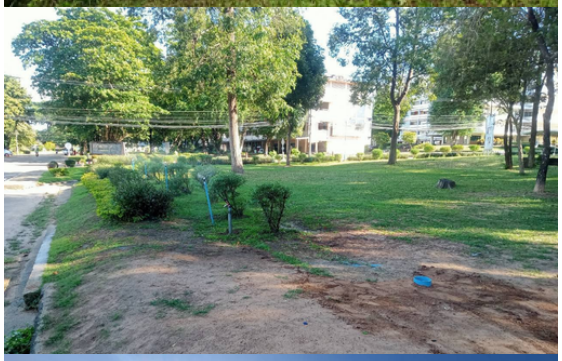


SNRU plants and maintains its green spaces with water in mind, so trees thrive on as little water as possible while keeping the campus ecosystem in balance.
Drought-tolerant trees. Most campus trees are drought-tolerant species suited to the hot, dry climate of Northeast Thailand, such as golden shower (khun, Cassia fistula), rain tree (chamchuri, Samanea saman), and flame of the forest (thong kwao, Butea monosperma). Their deep roots withstand the dry season, so mature trees need almost no watering. Their wide canopies also provide shade, reducing soil evaporation and cooling the area. Irrigation with stored and treated water. Most of the water for green spaces comes from campus reservoirs, including Nong Bak Dao, Nong Hai, and Nong Ya Sai, and from 10,944 m^3 of treated building wastewater per year. It is distributed by sprinklers and water tankers, reducing the amount of water used for landscaping. Planting together to grow green space. SNRU runs regular tree-planting activities under its Green Office environmental management program. For example, at the "Planting Trees into a Great Forest" event for World Environment Day, executives, lecturers, and staff planted 1,600 seedlings donated by the Sakon Nakhon Provincial Office of Natural Resources and Environment. These activities add rain-absorbing green space and build awareness of water and environmental care across the university.



Water Reuse







SNRU's 9,598 students and staff use water every day in teaching buildings, offices, dormitories and canteens, while Sakon Nakhon faces drought almost every dry season. The university therefore reuses treated building wastewater to cut mains water use and protect the water resources of the Nong Han basin.
Wastewater from campus buildings goes through a biological aeration treatment system with 62 aeration units. Equipment is inspected monthly, and operations and effluent quality are reported to the Pollution Control Department every month. The treated water then flows through a constructed wetland and holding ponds for further natural treatment. It is then used to irrigate trees, lawns and green spaces across campus, delivered by pumping stations and water tankers.
Results

- 99,411.84 m^3 of wastewater treated per year
- 10,944 m^3 of treated water reused per year (912 m^3 a month on average), or 11.01% of treated water
- About 1.14 m^3 of reused water per person per year
- About 7.71 tCO_2eq of greenhouse gas emissions avoided each year by using less mains water

Carbon emissions (CE) avoided are calculated as:
$CE = EF \times N$
where
EF = emission factor = 0.7043 kg CO_2eq per m^3
N = volume of water reused = 10,944 m^3
$CE = 0.7043 \times 10{,}944 = 7{,}707.86$ kg $CO_2eq \approx 7.71$ t CO_2eq
Water reuse thus reduces mains water consumption, cuts discharge to natural waterways and lowers greenhouse gas emissions, making SNRU a model of efficient water use in the Nong Han basin. This supports SDG Target 6.3 on wastewater treatment and safe water reuse.

Promoting conscious water usage in the wider community

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Sakon Nakhon is home to Nong Han, one of the largest natural freshwater lakes in Northeast Thailand, yet it faces year-round water challenges. The rainy season brings urban flash floods, the dry season leaves farmers short of water, and natural water sources are degraded by unbalanced use. As a university for local development, SNRU looks beyond its own campus. It brings knowledge, research, and innovation to help communities use water wisely, safely, and sustainably.

In 2025, SNRU worked on community water along four lines:

- Leading by example: the university controls the quality of effluent from its wastewater treatment system and reports to the Pollution Control Department every month, protecting public waterways and the Nong Han basin.
- Reducing flood risk: the Sakon Nakhon SMART Water project installed real-time water-level stations and an online alert system and surveyed and classified the risk of vulnerable households along urban streams.
- Conserving and restoring water bodies: the Nong Han Center of Excellence hosted World Wetlands Day to raise awareness of protecting Nong Han, and the Faculty of Agricultural Technology worked with villagers to restore the Lam Oun River through a community curriculum and by releasing bred fish back into the river.
- Managing water for farming: SNRU delivered solar-powered pumping innovations to drought-hit communities in Sakon Nakhon and other provinces such as Ratchaburi, so farmers can use water efficiently with no electricity or fuel costs.

Every project works with communities, local government, and partners, including Sakon Nakhon Municipality, the Water Management Foundation, the National Research Council of Thailand (NRCT), and PMU-A. The aim is to give communities the knowledge and tools to care for water themselves. This supports SDG Targets 6.3 (reducing water pollution), 6.4 (water-use efficiency), 6.5 (integrated water resources management), 6.6 (protecting and restoring water-related ecosystems) and 6.b (community participation in water management).















