National Cheng Kung University

SUSTAINABLE
DEVELOPMENT
GOALS

Report   2021-22

SUSTAINABLE DEVELOPMENT GOALS

Contents

Our Impacts

33 rd

in the **World**
out of 1,406 universities
from 106 countries

10 th

in **Asia** for
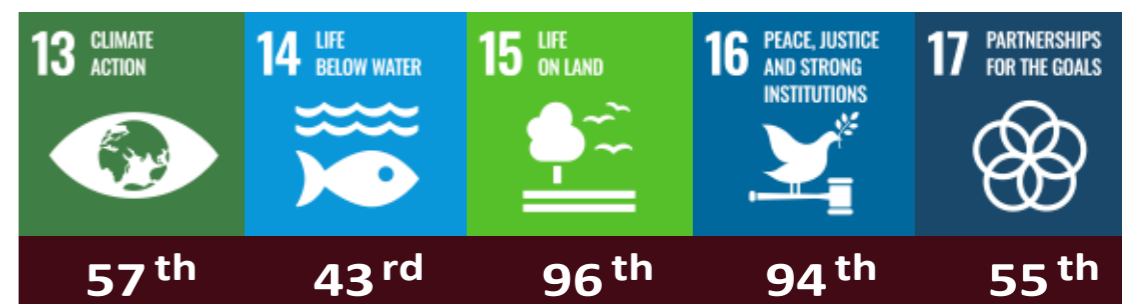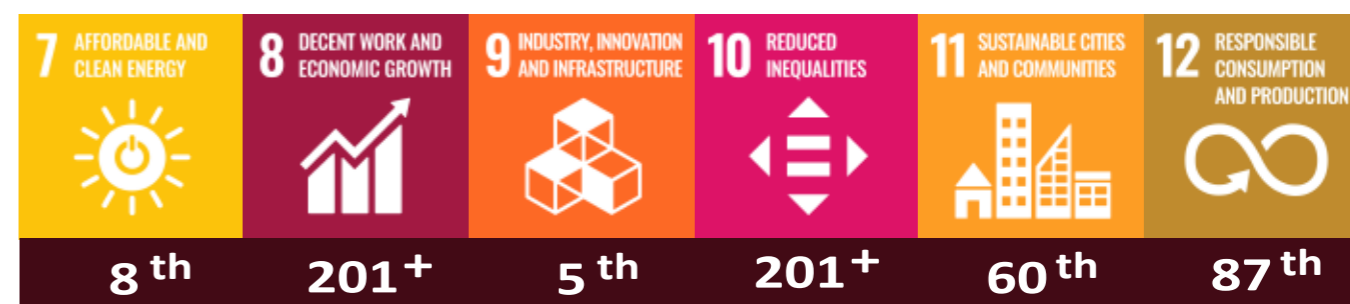**SDG** impact

1 st

in **Taiwan** for
SDG impact

The NCKU community significantly contributes to the welfare of the global community. Faculty, staff, and students utilize a culture of knowledge and technological innovation by forming an ethical foundation to support the disadvantaged for the betterment of society. This synergism connects cities to nations and promotes the idea of prosperity for all. The future of NCKU is intimately linked with humanity for perpetuity. As NCKU prospers, so do our people and society.

"NCKU is Leading the Sustainable Development Human Capital Development in Asia Region."

President
National Cheng Kung University

Huey-Jen Jenny Su

*data from Times Higher Education Impact Rankings 2022

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION
101+	30 th	101+	601+	201+	33 rd

7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
8 th	201+	5 th	201+	60 th	87 th

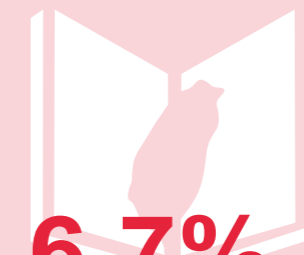| 13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS
57 th	43 rd	96 th	94 th	55 th

1 NO POVERTY

Research

Health, Income and Poverty

Researchers from the College of Medicine have found that health outcomes are significantly associated with the asset-based socioeconomic position (SEP) index. They suggest that healthcare professionals and policymakers should consider including an assessment of household assets and resources as a supplementary index to identify populations in need to receive appropriate care.

43 Publications 2017-2021

6.7% of all Taiwan publications 2017-2021

321 Courses covering SDG 1 in 2020-21 academic year

Food Insecurity among Economically Disadvantaged Youth

Researchers from our College of Medicine have found that food insecurity is associated with mental health and sleep outcomes in economically disadvantaged youth. Public health policymakers or governmental subsidy sectors should consider fund allocation and food delivery via reliable venues to ensure food security.

Education

Example Courses:

UP1501_Urban Sociology
LAW6048_Social Welfare and Law
IB7034_International Investment Theory
ECON6503_Economic Development: Theories and Policy

Action

Higher Education Deep Cultivation Program

Our Higher Education Deep Cultivation Program provides admission support to students from low socio-economic status. It offers financial, learning, and living support to students throughout their degree programs to complete their education.

Aid for Living & Housing Expenses

We provide on-campus part-time job opportunities to assist underprivileged students in pursuing their studies and help them acquire work experience and life skills. Regarding housing assistance, we provide affordable on-campus housing to students with 5120 beds and rent allowance for low-income students.

Emergency and Condolence Allowances

Accidents or illnesses can negatively impact the financial status of students or their families. The university offers timely financial assistance to students and their families. Thus, playing a small role in helping students to overcome challenges in completing their degree.

Support for International Students

We founded the Veritas et Conscientia Scholarship (VCS) in 2019 with the objective of helping relieve the financial burden on international students pursuing a doctoral degree in Taiwan. Of the 62 recipients, 20 are from Indonesia, and 18 are from Vietnam. Awardees receive a monthly allowance of NT$30,000 (US$1,079) in addition to a tuition waiver. Also, the NCKU-Butterfly Program networks with enterprises and offers international students internship opportunities. Moreover, we provide in-campus part-time opportunities for international students to help them through financial difficulties.
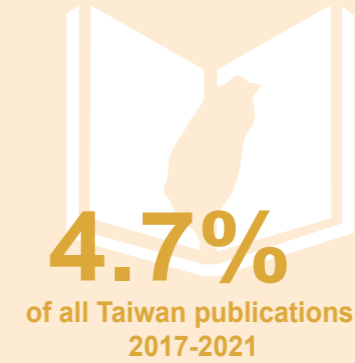
Outreach

Service Learning and Volunteer Abroad

NCKU encourages all its students to participate in social service and provides grants for volunteering abroad, hoping that all students can exhibit their altruistic spirit and devote themselves to the school and society. Our service-learning courses combine students' career development with volunteer activities that foster social responsibility, such as The Reader course is designed to help people who are blind or visually impaired by recording audiobooks.

2 ZERO HUNGER

Research

Ensuring Food Security and Hygiene

Professors from our Department of Environmental and Occupational Health focus on food security and the environment research. Recent work from Professor Pao-Chi Liao contributes to the quality assessment of fish and gains deeper insights into the metabolic reaction during storage. Professor Ching-Chang Lee has found the effectiveness of contaminative source control of dioxins and suggests food originating from counties and administrate districts with higher contamination risk should be continuously monitored to ensure the safety and hygiene of food.

60
Publications
2017-2021

4.7%
of all Taiwan publications
2017-2021

244
Courses covering SDG 2
in 2020-21 academic year

Sustainable Agriculture Development

Climate change affects global crop production year after year. Exploring the impact of different fertilization methods on crop yield stability has become a crucial topic in sustainable agriculture. Researchers have shown that chemical fertilizer had the lowest yield resilience in response to regional relative humidity change compared to organic and integrated fertilizers. Their results also indicate that specific soil microbes have the potential to help sweet corn face environmental vulnerability in subtropical regions.

Education

Example Courses:

LS2425_ Urban Agriculture and Food Safety
LS7715_ Agricultural Product Processing and Value Added
GE2429_ The Advantages and Disadvantages of GM Food
TAS9191_ Special Topics in Translation Agricultural Sciences

Action

Healthy and Sustainable Food on Campus

The University is committed to improving access to healthy and sustainable food on campus. We provide a healthy and sustainable food choice to students and staff through our on-campus cafeteria. Our student cafeteria offers various food choices such as vegan, non-vegetarian, dairy products, and halal food. We are working hard to eliminate single-use plastic and packaging on campus.

Eco-Friendly Farming Practices

Through the USR project, we share our research and development results in agriculture and aquaculture with the community and let more people realize the importance of friendly agriculture and ecological aquaculture to sustainable development. The research group has assisted more than 3,000 farmers and fishermen in reducing chemical fertilizers and increasing productivity by using technology, thus creating a friendly farming environment.

Advancing Food Safety Education

The University supports the production of safe and novel foods that increase the economic viability and sustainability of the food industry in Taiwan. We offer a Master's degree in Food Safety/Hygiene and Risk Management, which teaches students about food and nutrition safety, sustainable food systems, health risk assessment, and risk management and communication for addressing any food safety issues.

Outreach

School Meal Innovation Promotion Project

School meals represent a significant portion of children's daily diets. The project aims to support governments and institutions in providing healthy foods with low environmental impact to children and adolescents, promoting sustainable foods to young generations. Through our comprehensive toolkit and technical support to improve school meals, school food environments, and procurement processes from local food systems.
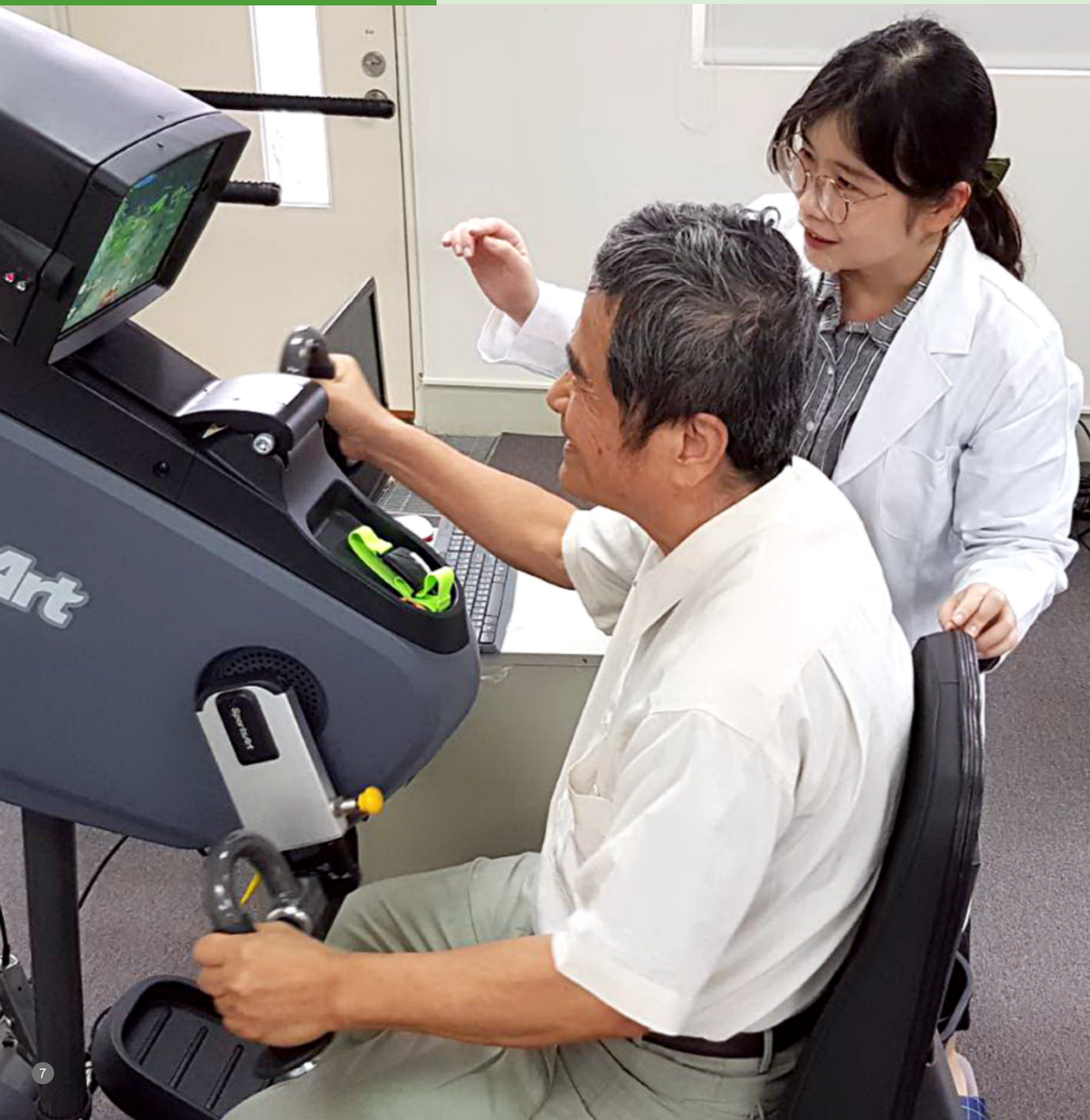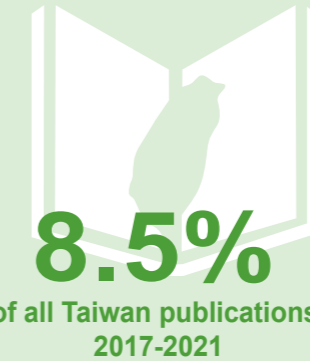
3 GOOD HEALTH AND WELL-BEING

Research

MenTAUR: Alleviating Depressive Symptoms of Chronic Stress

Our iGEM team has utilized synthetic biology to design "MenTAUR", a special type of bubble that can produce corresponding amounts of taurine to help alleviate depressive symptoms of chronic stress. This invention won the gold medal in the "2021 International Genetically Engineered Machine Competition (iGEM)" and was nominated for the Best Sustainable Development Impact Award.

2,958
Publications
2017-2021

8.5%
of all Taiwan publications
2017-2021

1,392
Courses covering SDG 3
in 2020-21 academic year

Dengue Fever Early Warning System

Dengue is a viral infectious disease that is transmitted by mosquitoes. Our electrical engineering research group has developed an early warning system to alert staff and students when an outbreak of dengue fever is most likely to strike on campus. They apply AI and big data analytics with ovitrap surveillance data and meteorological information for making predictions.

Education

Example Courses:

BMS9034_Precision Medicine
GE2407_Adolescent and Children's Health
GE2121_Promotion of Occupational Health
MED4315_Theory and Practice of National Health Insurance

Action

Rapid COVID-19 Screening Station

We actively implement COVID-19 prevention policies and have set up a rapid screening station that provides free rapid screening tests for NCKU faculty, students, and staff. A team of volunteers, made up of students from the College of Medicine, will be on-site to provide consultation on rapid screening.

HealthCare Promotion System

Our researchers have developed an intelligent game-based AI HealthCare Promotion System. It could help to reduce the heavy burden of healthcare labor and be easily adopted in the community for remote consultation and preventive healthcare.

The Center of Infectious Disease and Signaling Research

The Center of Infectious Disease and Signaling Research (CIDSR) of NCKU focuses on understanding how various agents including dengue virus, enteroviruses, hepatoma-associated viruses, and microbiota cause different human diseases. We have developed a range of novel diagnostic kits and found antivirals to help identify individuals as candidates for therapeutic antibodies to decrease this disease's morbidity.

Environmental Safety and Health Center

NCKU is committed to protecting the health, safety, and well-being of all staff, faculty, students, and visitors of NCKU. Our Environmental Health and Safety Center (EHS) is dedicated to ensuring a safe and healthful environment and constructing a sustainable campus for all members.

Outreach

Fostering Well-Being in the Elderly

We are working to help the growing older population not only to live longer and healthier but also better and happier. Our Accompanying 2026-Aging Life Micro-Community Action Network USR project is designed to help older adults improve their well-being by acquiring skills and strategies to cope with present and future challenges and enhance seniors' quality of life by increasing their vital involvement and active engagement in life.
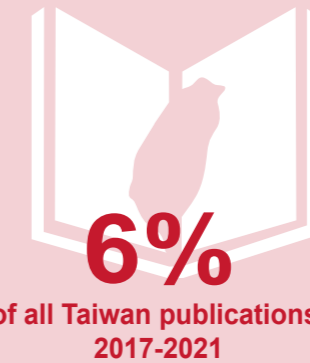
4 QUALITY EDUCATION

Research

Design Thinking for Flipped Learning

Researchers have proposed the new design thinking model that bridges a gap in the existing reflective pedagogy and design thinking literature. Using their method in flipped programming courses, students can obtain more learning benefits than may be otherwise possible, which may enhance their 21st-century skills.

227
Publications
2017-2021

6%
of all Taiwan publications
2017-2021

1,336
Courses covering SDG 4
in 2020-21 academic year

Cultivating Creativity by Maker Education

Professor Chin-Feng Lai and his team have designed a curriculum based on IoT programming and peer learning. It could train students' entrepreneurship by integrating maker education into a programming course and developing their computational thinking ability.

Education

Example Courses:

GE1045_Exploring Tainan
GE2030_Design Thinking: The Launchpad
NURS7054E_Seminar in Nursing Education
BBS7019_STEM Interdisciplinary Practices

Action

Cross College Elite Program

We respect every diversified choice and customize a differential learning plan for students. The Cross College Elite Program (CCEP) was established to cultivate students as a professional leader with international macro-perspective, professional literacy, lifelong learning, ability and social concern.

Education for Sustainability

Our Certificate Program in Sustainable Development (CPSD), open to all degree students, focuses on addressing real-world issues related to sustainability. CPSD is an international, interdisciplinary English program that allows students to distinguish themselves by supplementing their degrees with a specialization in sustainability.

Online Learning Platform: N3learning

Open access to learning is a powerful socioeconomic equalizer. Our "N3learning: New, Next and Novelty" platform offers expert-led, free massive online courses (MOOCs) and paid professional development courses in various subject areas.

Widening Educational Support

Achieving our goal of providing quality education to all, we offer a special admission quota to students from new immigrant families. We also make every effort to provide a happy learning environment for students with a disability by providing individual educational, moral, and financial aids.

Center for Teacher Education

The Center for Teacher Education offers information, academic advice, and support for students interested in pursuing a career in teaching, with an emphasis on preparing students for employment in secondary schools. The center conducts practical training, student counseling, and education programs and actively engages with students who want to become secondary school teachers.

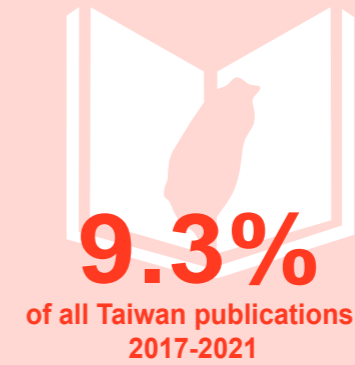## Outreach

IT Education in Rural Areas

To increase rural students' access to the latest information technologies, Professor Wen-Yu Su has initiated the Program the World project. This project provides rural students with accessible information technology resources to cultivate their programming skills and develops a game-based learning platform for AI education.

5 GENDER EQUALITY

Research

Gender Politics

In Professor Hsun-Hui Tseng's research, she selected three political events to examine if the female president facilitates the integration of state resources with the needs of civil society, especially about gender equality and civil rights. The three events illustrate the vitality of Taiwan's civil society and the achievements of Taiwanese feminist movements in the past decades.

67
Publications
2017-2021

9.3%
of all Taiwan publications
2017-2021

521
Courses covering SDG 5
in 2020-21 academic year

Women's Civil Liberties and Democratization

Professor Yi-Ting Wang has shown that inequality in civil liberties and rights between men and women – such as whether or not women are free to move, discuss politics, and hold material and immaterial assets – will affect the establishment of electoral democracy. Improving women's civil liberties is vital for democratization because it affects the costs of repression. For policymakers, the results can improve our understanding of current challenges for further democratization of regions where women's rights are weak.

Education

Example Courses:

GE2557_Gender and Society
GE2179 _Women and Politics in The Old China
FLL7321E_ Transnational Feminism
HIS6122_The History of Gender in Taiwan - Postwar

Action

Gender Studies Program

The Gender Studies Program at NCKU is an interdisciplinary academic program supporting transformational undergraduate- and graduate-level scholarship and teaching that explores how gender intersects with other social identities like race, ethnicity, sexuality, class, and disability. Through engaging feminist coursework, research, and practicum opportunities, teachers and students examine systems of power, privilege, and inequality to foster creative, collaborative, and sustaining social justice approaches.

Women in STEM Education

The Women in STEM Education Program supports the career development of women studying in the areas of science, technology, engineering, and mathematics (STEM) at NCKU. We also offer a range of scholarships for women faculty to encourage more female participation in engineering and science.

Gender-Friendly Toilets

The university has established gender-friendly toilets across the campus to solve the problem of uneven toilet space allocation for females and transgender people. Establishing gender-neutral restrooms will promote mutual respect and toilet etiquette among all and break gender stereotypes.

Gender Film Festival

NCKU regularly holds seminars to promote awareness of gender equality and to devise an adequate foundation for gender equality education. Movies are a fantastic medium to spread awareness, and our Gender Equity Education Committee routinely organizes gender film festivals to educate students and the public on gender equality.

Outreach

Supporting Women Leaders

Dr. Huey-Jen Su became the President of NCKU in 2015. She became the first female president in the NCKU's 83-year journey and was re-appointed as president in 2019. President Su was invited to the 2021 Women in Science & Technology Convention as a speaker discussing "The Role of Women in Globe Sustainable Development" with other women leaders.

6 CLEAN WATER AND SANITATION

Research

Algal-based Wastewater Treatment Technologies

Algae have attracted attention as an excellent agent for pollution prevention and waste phytoremediation. Our researchers have found that algal-based wastewater treatment technologies, high-rate algal ponds (HRAPs), and algal turf scrubber (ATS) showed economic feasibility and sustainability for wastewater treatment in pilot-scale and full-scale applications.

297
Publications
2017-2021

11.6%
of all Taiwan publications
2017-2021

229
Courses covering SDG 6
in 2020-21 academic year

Drinking Water Treatment

Researchers from our Sustainable Environment Research Laboratory (SERL) have proposed a biological raw water pre-treatment process to remove ammonia and other pollutants from Dong-Gan river. They have demonstrated that the BioNET system was feasible for the biological pre-treatment of ammonia-contaminated drinking source water.

Research Center for Water Science and Technology

This is an interdisciplinary research center with researchers from several departments working together. The center works on the phenomenon of natural water flow, water and ocean energy, water environment conservation, water resources utilization, and disaster prevention.

Education

Example Courses:

EV5001_Water Pollution Control
EV7029E_Water Quality Management
HOE3315_Water Resource Engineering
EV7012_Advanced Wastewater Treatment

Action

Rainwater Reuse

We have an efficient rainwater storage system, and the stored water is used for gardening, flushing toilets, and supplementing Cheng Kung Lake on the campus. From August 2016 to August 2021, 32,360 cubic meters of water have been processed through the rainwater reuse system.

Free Drinking Water

We provide free drinking water for students, staff, and visitors through more than 250 water dispensers on the campus. Each building floor on our campus has at least one free drinking water dispenser providing hot, warm, and cold water for everyone.

Providing Wastewater and Sewage Treatment Training Course

We have ensured that environmental professionals are equipped with the latest knowledge and skills. We offer wastewater and sewage treatment training courses for all qualified individuals, covering all aspects of water and wastewater treatment operations, maintenance, and management.

Outreach

Global Water Resource Governance Talent Training Camp

We hold the Global Water Governance Talent Training Camp every year and arrange many courses, lectures, experiments, and visits for high school (vocational) students so that students interested in water conservancy engineering or related disciplines can explore their interests. The workshop content includes lectures by professors, engineering graphics, hand-made experience, and a visit to Hydraulic Laboratory and Wusanto Reservoir.
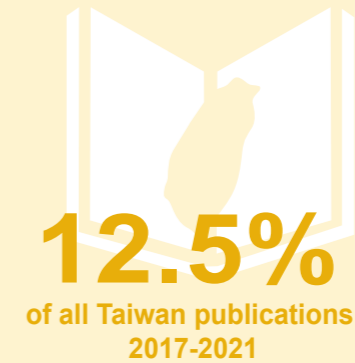
7 AFFORDABLE AND CLEAN ENERGY

Research

Offshore Wind Farm Development

The Laboratory of Offshore Geotechnics and Energy (LOGE) in the Department of Hydraulic and Ocean Engineering is engaged in soil mechanics and underwater foundation engineering-related research. At present, more than 50 research projects related to offshore wind power have been implemented. Professional courses related to the development of offshore wind farms are offered to more than 25 students to participate in the wind power industry.

1,525
Publications
2017-2021

12.5%
of all Taiwan publications
2017-2021

350
Courses covering SDG 7
in 2020-21 academic year

Hierarchical Green-Energy Materials Research Center

Researchers at the Hierarchical Green-Energy Materials Research Center (Hi-GEM) have developed several breakthrough technologies, such as high-performance silicon-carbon anode materials, the world's highest conversion efficiency printable dye-sensitized solar cells, and Calcium Titanate perovskite solar cells.

Research Center for Energy Technology and Strategy

Our Research Center for Energy Technology and Strategy (RCETS) has created thirty-two research groups that focus on a wide variety of energy technology. Thus far, several technologies have been developed and implemented in the industries, such as offshore wind farms measurement technology, flexi-fuel technology for energy saving and emissions reduction, multi-fuel energy-saving and lower-emission systems, and smart grid and energy storage systems.

Education

Example Courses:

EV7031_Environmental Nanotechnology
MSE5059_Introduction of Sustainable Materials
IBPE5006E_Biomass Energy Engineering
IBPE5005E_Clean Combustion and Pollution Control

Action

Water Chestnut Shell Charcoal Biomass Energy

Tainan's Guantian is one of the largest producers of water chestnuts in Taiwan, and more than 90% of chestnuts shells are abandoned for open burning. The team led by Professor Hung-ping Lin solved this issue by turning waste shells into biochar, a renewable and green fuel.

Multi-Fuel and Circulating Materials Demonstration Base

Our Multi-Fuel and Circulating Materials Demonstration Base is the exploration field that provides industrial technology development experiments, professional talent training, and student practical learning experiences. In the demonstration base, there is only an industrial-grade test furnace in Taiwan, which can be carried out for the combustion or gasification process of solid, liquid, and gaseous fuels.

The World's Greenest Buildings

Our Magic School of Green Technologies (MSGT) was selected as one of the World's Greenest Green Buildings and the first energy-saving and zero-carbon building in Taiwan. This green building results in energy savings of 65% and carbon emissions reduction of 52% compared to conventional buildings. It has a leaf-like solar panel on the roof, shaped like a leaf and decorated with a huge model ladybug, whose orientation can be adjusted to produce more electricity.

Outreach
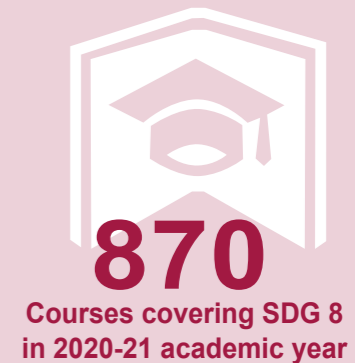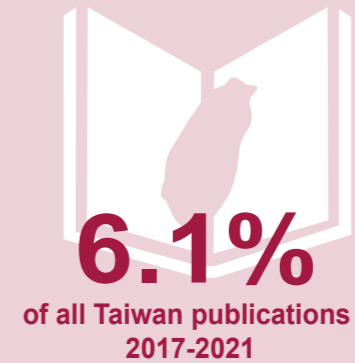
Solar Panel Donation

Unlike fossil fuels, solar panels do not produce carbon dioxide emissions while generating energy. The University has donated solar panels for disadvantaged social welfare organizations to mitigate their operational burden and implement sustainable development and green energy policy.

8 DECENT WORK AND ECONOMIC GROWTH

Research

Preventive Care and Economic Development

Our researchers have indicated that appropriate prevention is associated with decreases in the prevalence rates of ill health, which attains sustainable growth in productivity. With the suitable allocation of medical resources, the economic growth rate will help decreasing the healthcare expenditure for the elderly and expenses needed to improve the population's health as a whole.

157
Publications
2017-2021

6.1%
of all Taiwan publications
2017-2021

870
Courses covering SDG 8
in 2020-21 academic year

An App to Prevent Workplace Bullying

We believe that providing a safe working environment is essential for inclusive and sustainable economic growth. Professor Huan-Fang Lee developed an app for automatically detecting and classifying nurse bullying levels in hospitals in collaboration with researchers from various institutions. The app helps nurses self-assess workplace bullying at an early stage. This app can help nurses to work in a safe working environment.

Education

Example Courses:

LAW6124_Labor Law
PE7216_Theories and Policies of Economic Development
ECON5005_Economic Development and Happiness Economics
EOH7403_Practice of Environmental and Occupational Medicine

Action

Improving Graduate Employability

We have established an enterprise recruitment website NCKU E-Job, which allows companies to post job vacancies and students to search for job opportunities on the platform. To help students gaining work experience during the winter and summer vacations, the website also publishes internship vacancies so that students can learn the basic knowledge and skills they need through actual short-term work, shorten the gap between learning and use, and prepare for formal workplace entry in the future.

Safe Working Environment

We take any form of sexual harassment seriously and regularly make our students and staff aware of gender issues. We have a strict policy to prevent, report, and punish any form of sexual bullying. Our staff is regularly trained to be aware of their responsibility to ensure that the campus is safe and welcoming.

Student and Teacher Associations

The University has a thriving teacher association that protects their rights and interests. There are various associations and clubs for students to promote cultural activities. The associations serve as a platform to improve campus studying and working conditions.

Financial Literacy for Students

We have launched industry-university cooperation with Bank SinoPac, which not only successfully upgraded the campus mobile payment environment but also guided nearly 400 NCKUers to open a digital account and experience digital banking. We also cooperate with Bank SinoPac to set up two industrial master classes, "Finance" and "Fintech and Information Engineering," to improve students' financial literacy and help cross-disciplinary students gaining access to financial knowledge.

Outreach
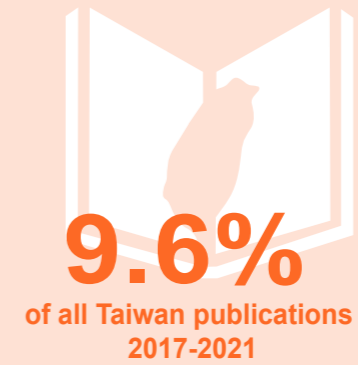
Center for Innovative Fintech Business Models

Research members combine AI, blockchain, and big data techniques with FinTech-related domain knowledge to generate a new innovative business model. They have assisted industries in integrating supply chain resources by launching innovative finance services and fostered FinTech new startup teams or companies in their technology development.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Research

Advanced Satellite Technology

Developed by NCKU's SPACE lab team, the IRIS-A CubeSat has been successfully carried out and launched into space by the SpaceX Falcon 9 in Florida, USA. Located at 500 km altitude, the IRIS-A CubeSat is estimated to be in motion for about 6 to 7 years under regular operation. Its mission is to demonstrate the IoT communication technology in space, and at present, the tracking data, satellite positioning information, and status data of the CubeSat are obtainable.

580
Publications
2017-2021

9.6%
of all Taiwan publications
2017-2021

913
Courses covering SDG 9
in 2020-21 academic year

Intelligent Manufacturing Research Center

Professor Fan-Tien Cheng has established an Intelligent Manufacturing Research Center (iMRC) to promote the idea of Industry 4.1, which involves using Industry 4.0 technologies to achieve the goal of zero defects for all products. The center is working on cutting-edge automation technologies and dedicated to assisting various manufacturing industries in achieving the goal of nearly zero defects in all manufactured products.

Education

Example Courses:

BA3111_ Business Feasibility Analysis
EMBA6916 _ Industry Convergence and Innovation
IMIS7215_ Industry 4.1: Intelligent Manufacturing with Zero Defects
TM7501_ New Generation Mobile Communications-Applications and Principles

Action

Corporate Relations and Technology Transfer Center

The objective of the Corporate Relations and Technology Transfer Center is to promote the research achievement developed by the faculty and students in the industries and, through continuous interaction with the industries, to enhance the nation's competitiveness and technology development.

Startup Accelerator Center

Our Startup Accelerator Center promotes the innovation and entrepreneurship of teachers and students on campus and provides support to on-campus start-up teams and off-campus companies. To encourage teachers and students from what they have learned to turn creativity into reality, we organize the "NCKU Innovation Dream Project" every year and provide nearly four million NTD entrepreneurship subsidies and entrepreneurship-related professional consulting services.

Smart Campus Security Center

By incorporating a surveillance system, an emergency notification system, and campus police dispatch, we established the Smart Campus Security Center. We placed 18 red emergency booths with security cameras on every side all around the campus. This is the first security center to incorporate AI among universities in Taiwan. Since its launch in 2020, the intelligent security system has already assisted with several traffic accidents, COVID-19 contact tracing, and emergencies on the campus.

Outreach

GLORIA 2.0 SOUTH Platform

The University is committed to promoting industry-academia collaboration, with the amount of technology transfer exceeding NT$100 million per year for 12 consecutive years. The NCKU GLORIA 2.0 SOUTH platform comprises 12 schools, bringing together rich R&D capabilities, forward-looking intellectual property resources, and diverse globally industry-university-institute links of the allied schools to create a regional inter-university integration platform.
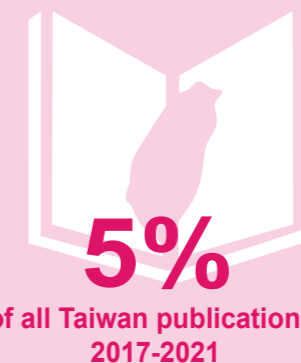
10 REDUCED INEQUALITIES

Research

Income Inequality and Traumatic Spinal Cord Injury

Researchers from the College of Medicine have studied the association between economic indicators and the incidence of tetraplegia from traumatic spinal cord injury in Taiwan. Based on their results, they recommend that the government continues to improve infrastructure and enforce traffic regulations in rural regions of Taiwan to reduce the urban-rural disparity and decrease income inequality in the prevention of tetraplegia of traumatic spinal cord injury.

70
Publications
2017-2021

5%
of all Taiwan publications
2017-2021

430
Courses covering SDG 10
in 2020-21 academic year

Center for Multi-cultural Studies

Min-Nan culture has its unique population, language, literature, history, concepts, folks, religion, society, architecture, arts, operas and music. Our Center for Multi-cultural Studies promotes the Min-Nan culture study with the basis of Taiwan and unites scholars from worldwide to work on the study of Min-nan culture on comparing its communication, integration and changing.

Education

Example Courses:

LAW7866_ Seminar on Indigenous Law
GE 2036_ Health Inequality: Theories and Policy
CL1135_ Serving Remote Communities through Language Education
OT5321_ Practical Training in Universal Design for Multi-Equity Environment

Action

Reducing Inequalities for LGBTQ

To reduce prejudice against LGBTQ people, we regularly organize seminars, newsletters, and screen movies to make NCKU students aware of LGBTQ issues and conduct public talks and activities to help them better understand LGBT people.

Financial Support for Underrepresented Groups

We provide a range of subsidies and scholarships to increase college opportunities for underprivileged and minority students.

Disability Support Services

The University is a disability-friendly campus with all the required infrastructure to make their stay a happy experience. We also provide individual educational, housing, counselling, and financial support to encourage them to study on our campus.

Counseling and Wellness Services

Our Counseling and Wellness Services Division (CWSD), a team of 14 full-time professional counselors including psychologists and social workers, provides a variety of mental health services to all NCKU students. Part-time counselors are accessible for individual therapy and English counseling is available for international students.

Indigenous Student Resource Center

We set up the Indigenous Student Resource Center (ISRC) to encourage the study of indigenous culture, care for indigenous students, and make them proud of their own cultures. The IRSC also provides consultations on school life, career, and ethnic education for indigenous students to promote and build a more multicultural-friendly campus.

Outreach

Eliminating Rural Education Inequalities

The NCKU BOOK-ONE CITY Mobile Library has entered the 13 administrative districts of Tainan and Chiayi, bringing the collection of resources and courses on creativity and narrativity to the rural schools, and designing the display method with specific themes, so that the children in the rural areas are also able to learn advanced knowledge, creating a high-quality and equal education environment for every child in Taiwan.

11 SUSTAINABLE CITIES AND COMMUNITIES

Research

Autonomous Vehicles for Smart and Sustainable Cities

Sustainable transportation solutions are required to meet the increasing demands for mobility while mitigating the potentially negative impacts. Professor Jyh-Ching Juang has devoted himself to developing innovative technologies for autonomous vehicles to make cities inclusive, safe, resilient, and sustainable. His research group has developed unmanned vehicle systems and high-definition autonomous driving.

476
Publications
2017-2021

11.6%
of all Taiwan publications
2017-2021

747
Courses covering SDG 11
in 2020-21 academic year

High Definition Map Research Center

High-definition maps play an important role in autonomous driving modules, including perception, simulation, localization, and path planning. Our High Definition Map Research Center (HDMAPC) collaborates with government organizations and manufacturers to construct high-definition maps across Taiwan. The center also integrates high-definition maps and AI recognition technology to develop automatic variant detection technology for highways.

Education

Example Courses:

ARCH3016_Planning of Green Building
GE2055_Eco-Museum and Tainan Cultural Assets
UP5371_Sustainable Planning & City Marketing Practices
UP4206_SDG11 Research on Sustainable Development of Rural Industry

Action

Centre for Archaeology and Cultural Heritage

The Centre for Archaeology and Cultural Heritage (CACH) carries out excavations, field surveys, and other projects on the many sites of archaeological value in and around the NCKU campuses. Currently, the center is undertaking a massive project titled "Four Hundred Years of Fort Zeelandia." This project explores Tainan during the Age of Exploration through mutual verification of documents such as the 1643 Fort Zeelandia Cadastral Register, mapping, and excavations.

Paperless Campus Program

Our Paperless Campus program is designed to reduce and remove existing paper documents stored within each department's physical repository. We have partnered with a vendor specializing in innovative mobile technologies to reduce the need to use paper as a medium for transferring information and improve the level of document digitization through implementing their e-signature and document editing software services.

Shalun Smart Green Energy Science City

We take part in the national development plan "Shalun Smart Green Energy Science City" to create a smart ecological city with a symbiotic relationship with nature, to construct community development and its necessary living system with a human-centered approach, and to transform part of the area into a demonstrative field for the development of low-carbon, intelligent technologies.

Outreach

Collaborative Badlands Project

Tourism industries in the badland regions of southwestern Taiwan face impacts from the decreasing population. Our Collaborative Badland team from different disciplines has come together to transform the situation of the badland regions by focusing on new experiences, industries, and information. They have conducted workshops with local communities and designed new business models to help develop sustainable in-depth badland tourism.
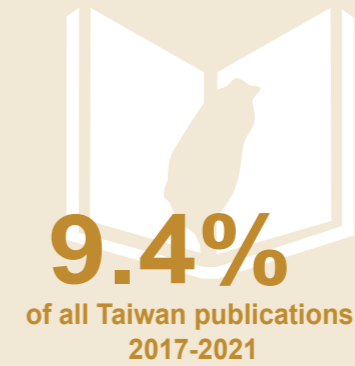
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Research

Quantifying Food Packaging Generation and Material Loss

Professor Hsin-Tien Lin and her team have found that the main reasons for the material loss of food packaging differs among product types. Bottled beverages contributed 49.56% of the packaging waste generation. Seafood, meat, and multilayer packaging has the highest unrecyclable ratio. Their research results suggest that to promote plastic food packaging recycling, identifying the limitations in different stages and designing corresponding strategies is crucial.

271
Publications
2017-2021

9.4%
of all Taiwan publications
2017-2021

320
Courses covering SDG 12
in 2020-21 academic year

Waste Electronic Home Appliance Treatment

Our researchers have proposed an optimum treatment system for the waste electronic home appliance in remote areas by local pre-processing and outsourcing post-processing. Their research results reveal that the implementation of local pre-processing can contribute to the cost reduction for four main types of electronic home appliance.

Education

Example Courses:

EV7003E_Circulation of Resource
IIM7109E_ Sustainable Operations Management
RE5210_Urban Mining and Circular Economy
IMBA7108E_Consumer Behavior

Action

Model Construction Without Styrofoam

To promote waste reduction, the Department of Architecture decided to prohibit using Styrofoam to construct models. Professors and students agreed to the new policy, and the department's studio currently provides environmentally friendly alternative materials such as corrugated paper and wooden boards for model construction.

Laboratory Waste Charge System

Our Laboratory Waste Charge System levies the charges needed for handling those wastes which are difficult to recycle and are susceptible to harmful substances and issues in the process of waste management to curb the generation of other wastes and prevent wasted resources.

Waste Treatment Plant

The nation's first and only facility with the ability to handle laboratory waste and conduct scholarly study on the topic is Our Waste Treatment Plant. Stability, resourcification, and harmlessness are the guiding principles for treating laboratory waste. The overall processing operations do not emit harmful gasses, liquids, and solids, it can aid schools at various levels within the nation in appropriately processing laboratory waste and restoring safe and clean learning environments to schools.

Outreach

Promoting Returnable and Reusable Takeout Containers

Reusable food service containers beat single-use alternatives through every environmental measure. We partner with eco-conscious restaurants and food delivery platforms to bring consumers convenient, earth-friendly meals in premium reusable packaging and set up smart self-return stations in the campus. It allows restaurants to decrease their carbon footprint, appeal to eco-conscious customers, and save money.

Research

Automatic Landslide-Quake Identification

Climate change is increasingly causing severe natural disasters globally. Landslides are also most likely to increase under the potential intensification of the hydrological cycle. Effective detection of landslides is vital to mitigate their severe impacts. Our researchers have developed an automatic landslide-quake identification system for landslide detection and location, which can provide more precise occurrence times of landslides for historical events and presents the potential for implementing a nearly real-time alarm system for large landslides.

354
Publications
2017-2021

13%
of all Taiwan publications
2017-2021

388
Courses covering SDG 13
in 2020-21 academic year

Assessment of Forest Restoration

Climate variability and man-made impacts have severely damaged forests around the world in recent years. Our researchers have proposed a new three-level decision tree approach to map forest, shadowy, bare and low-vegetated lands sequentially by integrating three spectral indices. Their work supports the use of multi-temporal remote sensing imagery as a reliable source of data for assessing the effectiveness of forest restoration regularly.

Education

Example Courses:

CCEP1017_Design Thinking for SDG13 Propothon
EV3208_Atmospheric Pollution and Climate Change
GE2521_Global Warming and Extreme Weather Events
EV7008_Climate Change and Air, Water Resource Management

Action

Commitment to Carbon Neutrality

We have adopted an ambitious policy to reduce our greenhouse gas (GHG) emissions and achieve carbon neutrality by 2041 by completing the following targets:

- Reduce GHG emissions to the year 2010 levels by 2024.
- By 2029, reduce emissions to the year 2000 levels.
- Reducing our carbon footprint by half in the year 2031.

Carbon-Negative Factory

We established Taiwan's first carbon-negative factory for promoting carbon removal technology across various industries in Taiwan, including some of Taiwan's largest corporations. The factory turns carbon dioxide into a resource for petrochemical materials and is divided into two sections: CO_2 capture and purification and purified CO_2 alkylation for reuse.

Tree Planting and Care

The University is actively working towards making its campus greener by simultaneously working on various activities such as:

- Routinely organizing plantation drives on the campus.
- Identifying and protecting older trees on the campus.
- Setting up an electronic map and database of campus trees for effective management and education.
- Attaching QR codes to each tree so that anyone can find more information on that tree species.
- Conducting campus tree walks on a regular basis to instruct NCKU students and the general public on the value and methods of tree conservation.

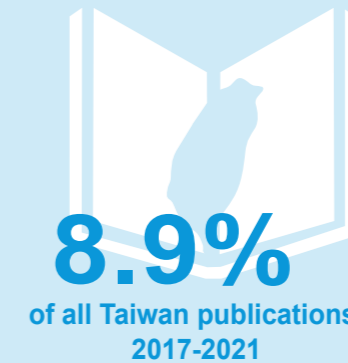## Outreach

Global Climate Data Analysis

Our scientists at the Global Earth Observation and Data Analysis Center (GEODAC) are working on developing and applying the multi-stage remote sensing platform to observe the global environment at crucial moments and places and providing analyzed results and value-added products to support the demands from various realms. It will help accurately forecast extreme weather conditions, thus helping the government in disaster preparedness.

14 LIFE BELOW WATER

Research

Enhancing Maritime Safety

Our researchers have developed the Taiwan Marine Environment Monitoring Service (TwMEMS), which integrates marine environmental parameters, including wind, wave, tide, current, and temperature components, from in-situ and remote sensing observations, ship reports, and numerical models to support the safety of various marine-related activities in Taiwanese waters. This service platform is now in operation and has served more than 10 governmental institutions and numerous public members in Taiwan.

124 Publications 2017-2021

8.9% of all Taiwan publications 2017-2021

261 Courses covering SDG 14 in 2020-21 academic year

Dolphin Conservation from Fishers' Perspectives

The Chinese white dolphin is classified as Near Threatened (NT) in the Red List of Threatened Species published by the International Union for Conservation of Nature (IUCN). Our researchers have found that stakeholders have different perceptions of the fishers' attitude toward conservation and thought fishery-related law enforcement could be difficult. Most fishers considered temporary fishing closure as feasible for conservation.

Education

Example Courses:

HOE6813_ Maritime Safety
LS7735_ Cetacean Rescue & Rehabilitation
LS7530_ Physiological Ecology of Marine and Estuary Environment
OTMA9500_ Study on Legal Problems Out of the Fish-Breeding and Fishing

Action

Saving Cetaceans

Our Marine Biology & Cetacean Research Center (MB&CRC) was established to rescue, conserve, and conduct scientific research on marine life animals. The center works closely with the coastal villagers, volunteers, and government agencies to conserve the marine environment. As of today, the team has rescued over 90 live stranded cetaceans since 2000. Among them, nine cases were successfully released back into the ocean. The primary goal is always to release the stranded dolphin or whale after integral rescuing, medication, rehabilitation, and recovery.

Sustainable Shrimp Aquaculture

Researchers at the International Centre for Scientific Development of Shrimp Aquaculture (ICDSA) are working on achieving a sustainable shrimp aquaculture industry. They have successfully developed and implemented control measures to minimize disease outbreaks; produced pathogen-resistant shrimp and systems that conserve energy and water.

Intelligent Fish Aquaculture

Researchers from the Department of Biotechnology and Bioindustry Sciences have spent more than three years developing a fully automatic and sustainable "Fish Breeding Intelligent Production System." The primary feature of the system is its complete automation in detecting the size of fish and water quality and producing appropriate feed, such as algae and food organisms. The system can save 60% of human resources and 40% of production costs and increase the breeding rate of seedlings by 10 times to a steady 3%-5% as compared to traditional breeding methods.

Outreach
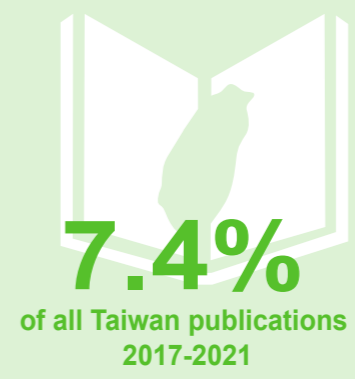
Marine Weather Observations and Forecasts

NCKU Coastal Ocean Monitoring Center (COMC) was established to assist the government in establishing the long-term and operational monitoring network. The center deploys moored buoys and installs automatic meteorological or oceanographic, such as tide stations, pile stations, and coastal weather stations that are primarily located in nearshore areas or in the deep ocean to provide real-time data for governmental agencies, such as Central Weather Bureau, Water Resources Agency and Tourist Bureau.

15 LIFE ON LAND

Research

Managing Wetland Habitats for Waterbirds

Professor Hsiao-Wen Wang and her team are involved in the long-term research in the Budai Salt Pan Wetland in Southwestern Taiwan. Their research has provided practical solutions to flood management in wetlands showing that they play a vital role in protecting neighboring communities from flooding while at the same time preserving bird habitats. They are making local communities aware that water gate operations can improve habitat for waterbirds in salt pan wetlands.

95
Publications
2017-2021

7.4%
of all Taiwan publications
2017-2021

291
Courses covering SDG 15
in 2020-21 academic year

Amphibian Diversity in Rainforests

Our researchers have assessed species composition, diversity, and distribution patterns of rainforest amphibian assemblages in central Vietnam using a hierarchical analysis of diversity across study areas and different habitat types. They have found that the species richness and relative abundance of amphibians in primary forests are significantly greater than that in secondary forests, suggesting that assemblages of amphibians in interior forest habitats may be more vulnerable to alterations caused by disturbances.

Education

Example Courses:

LS3006_Ecology
LS7508_Behavioral Ecology
HOE6047_Management of Wetland Environment
HOE6811_Restoration and Management of Coastal Wetland
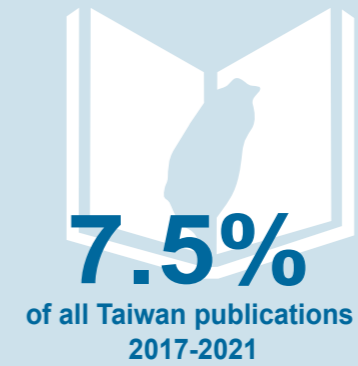
Action

Preserving Biodiversity on Campus

The University is committed to promoting biodiversity and raising awareness towards ecological gestures to ensure a pleasant and healthy environment for all, conducive to the flourishing of life. We have taken several steps, such as planting native species, establishing an online database, educating staff and students, and constructing ecological corridors to conserve biodiversity on campus. Currently, on-campus, there are 5,368 plants and trees of 134 species from 47 families.

Mapping Taiwan's Tall Trees

Climate change will challenge tall trees, which are especially vulnerable to rising temperatures. Professor Chi-Kuei Wang and his team works with Taiwan Forestry Research Institute to apply an island wide airborne LiDAR (light detection and ranging) survey to map Taiwan's tall trees. In 2019, they discovered the tallest Taiwania tree yet found in Taiwan. Measuring 72.9 meters, the tree is located in the upper reaches of Nankeng Creek on Mt. Daxue.

Land Subsidence Prevention

Our scientists at the Laboratory of Hydraulic Test are working on developing land subsidence prevention strategies in Taiwan to protect the groundwater environment, slow down stratum subsidence, and reduce the flooding potential of severely subsided areas by continuously managing and updating the stratum subsidence inspection and monitoring system.

Outreach

Management of Wetland Environment Workshop

Wetlands support life along all parts of the food chain, and its ecosystem services provide climate regulation, flood mitigation, cultural richness, and economic opportunities. The Management of Wetland Environment Workshop was a full-day experience in which students had the chance to work with wetland professionals to learn about the importance of maintaining these ecosystems in Taiwan and the world.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Research

Air Pollution and Criminal Activity

Professor Pei-Fen Kuo and her team have studied the relationship between air pollution and various types of crime, including domestic violence, robbery, and fraud. They found that air pollution was positively related to domestic violence and fraud and negatively associated with theft. Thus, in the higher population areas with more severe air pollution, local authorities should allocate more resources, extra police officers, or more training programs to help them prevent domestic violence rather than focusing on robbery.

89
Publications
2017-2021

7.5%
of all Taiwan publications
2017-2021

457
Courses covering SDG 16
in 2020-21 academic year

2021 Tainan International Human Rights Festival

Legislative Strength and Democratic Satisfaction

Professor Yi-Ting Wang has investigated whether the oversight capacity of legislatures reduces the winner-loser gap in satisfaction with democracy by utilizing public opinion and expert survey data that cover 29 presidential democracies. Her results show that weak legislatures are detrimental to democratic stability, and the effects of legislative strength are not uniform within a country.

Education

Example Courses:

GE2118_ About Justice
LAW6048_ Social Welfare and Law
EMBA6835_ Business Ethics and Legal Topics
PS3309_ Civic Consciousness and Policy Communication

Action

Providing Legal Services

For more than 20 years, our Department of Law has offered legal clinics where students take first-chair lead responsibility for real clients with real legal needs. Clinics allow students to gain hands-on experience helping clients who would not otherwise have access to high-quality legal representation. The department also involves public education workshops and law reform activities to help spread and protect the rule of law.

Lectures from Prominent Law Scholars

The Department of Law regularly invites prominent law scholars and practitioners from around the country to give lectures on various legal issues. These lectures cover subjects from technology to politics to critical theory in law and bring leading experts in many fields to speak to law school students and faculty.

Anti-Corruption and Bribery

We publicly share all our financial information on our website to ensure financial transparency. Staff and faculty members must abide by and comply with disciplines and customs of the civil service and ethics for civil servants under regulations stipulated by the Executive Yuan.

NCKU Students' Union

The NCKU Students' Union is a student-led organization representing the collective voice of all our undergraduates and graduates. The Union aims to empower the voices, advocate the interests, and enhance the vibrancy of campus life of students and works closely with the University to ensure their rights are protected.
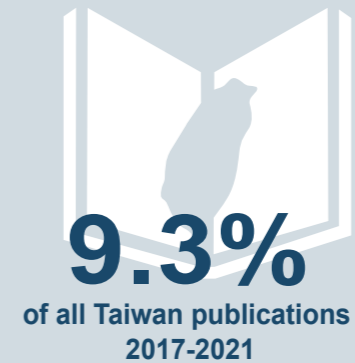
Outreach

International Human Rights Festival

NCKU has held the International Human Rights Festival for three consecutive years, attempting to promote human rights education through artistic and cultural productions. The exhibition of 2021 is curated based on the theme "crossing the boundary" to talk about human rights issues from different historical and geopolitics perspectives.

17 PARTNERSHIPS FOR THE GOALS

Research

Global Research Group

We prioritize global partnerships to advance our work toward the SDGs. The Global Research Group – Asia SDGs is initiated by NCKU with the support of WUN. This research group aims to promote, implement, study, and compile the best SDG-related practices and commits to facilitating and inspiring more in-depth and thought-provoking case studies of SDG practices in Asia. Currently, the research group has 11 collaborative SDGs research projects run by 58 researchers from 20 institutions across 11 countries.

7,393
Publications
2017-2021

9.3%
of all Taiwan publications
2017-2021

410
Courses covering SDG 17
in 2020-21 academic year

Involvement in U.S.-Taiwan Satellite Program

NCKU teams up with U.S. National Oceanic and Atmospheric Administration and National Space Organization to develop a new space weather monitoring and forecasting system for the FORMOSA-7. Our research team is responsible for designing and integrating mission systems, developing 6 spacecraft, constellation mission operations, and data processing and application.

Education

Example Courses:

PS3405_ American Policy
PS3408_ International Relations in Asia-Pacific
CLC2016_ Intercultural Communication
FIN6059_ Sustainability and ESG Investment

Action

International Partnerships

NCKU is the founding member of the Presidents' Forum of Southeast Asia and Taiwan Universities (SATU Presidents' Forum). This forum provides opportunities for researchers from the Southeast Asian region to work together to make impactful contributions to the SDGs. Every year through SATU, we fund joint research projects between NCKU and other partner institutions.

Improving Global Outcomes via Partnerships

We lead and participate in global, national, and regional partnerships to advance our impact on the SDGs. In 2021, we partnered with Ryukoku University to host the 2021 Inter-Asia SDGs E-Forum. Participants from Japan and Taiwan shared their experiences and presented their research findings on SDGs.

Asia-Pacific Partnership on Nursing

In 2019, we established the Asia-Pacific Alliance for Nursing Education (APANE) to respond to the challenges in current nursing education in Asia and Pacific regions. This alliance provides a platform to generate educational innovations for fostering future nursing leaders.

International Summer School

Starting from 2013, we have been offering a unique short course on SDGs. Professors from multiple departments specially designed these courses to provide interdisciplinary learning to students. 2021 NCKU Summer School included 53 students from 19 universities from 8 countries.

Outreach

PPAP for Sustainable Future

NCKU, Shalun Innovation Alliance (SIA), European Chamber of Commerce Taiwan (ECCT), and Tainan City Government have signed a memorandum of understanding (MOU) to collaborate in realizing sustainable developments with joint efforts from the academia, government, and industry. We are also determined to promote sustainable development, aiming to reduce our carbon emissions by half by 2041.

SUSTAINABLE
DEVELOPMENT
GOALS

About this Report

This report summarizes the range of activities the National Cheng Kung University undertakes to meet the United Nations Sustainable Development Goals. Thus, this report constitutes only a subset of the many initiatives NCKU has embarked on about the SDGs. Additional information can be found on the NCKU Sustainability website. All publication data used in this report for each SDG is based on the Scopus database for the 2017-2021 timeframe.

國立成功大學
National Cheng Kung University