SUSTAINABLE DEVELOPMENT GOALS

KYUNGPOOK NATIONAL UNIVERSITY 경북대학교

ADVANCING THE SUSTAINABLE DEVELOPMENT GOALS REPORT 2025

TABLE OF CONTENTS

INTRODUCTION

The Sustainable Development Goals (SDGs) are a global imperative. At the forefront of this movement, we at Kyungpook National University (KNU) have embedded the SDGs into our institutional DNA, aligning education, research, and societal engagement with the urgent call for inclusive and sustainable progress.

At KNU, our strategic framework, the **KNU 2030 Sustainable Development Plan,** is a bold declaration of this commitment. Spanning six core pillars—**Educational Innovation, Leading Research, Specialized Approach, Sustainable Talent, Community Contribution,** and **Better Connectivity**—the plan integrates sustainability across academic, regional, and global dimensions.

In 2023, we further reinforced this vision by launching our **Innovation Project: Carbon Neutrality,** targeting environmental responsibility alongside academic excellence. With **165 SDG-aligned subtasks** and an overall **achievement rate of 42.2%,** our university is steadily advancing toward its **2027 target of 80% completion.**

KNU's progress is data-driven and purpose-led, ensuring that our impact extends beyond the campus. From tackling climate change to reducing inequality and fostering innovation, each initiative strengthens our position as a transformative force in higher education. Through nurturing globally responsible talent and building meaningful partnerships, we continue to champion the SDGs—not as a trend, but as a responsibility to future generations.

Times Higher Education
Impact Rankings 2025

Overall Ranking **#3 GLOBALLY**

Ranked within the **global top 20 in 6 of the 17 SDG categories**

8 DECENT WORK AND ECONOMIC GROWTH	2nd
2 ZERO HUNGER	12th
15 LIFE ON LAND	13th
17 PARTNERSHIPS FOR THE GOALS	16th
1 NO POVERTY	16th
11 SUSTAINABLE CITIES AND COMMUNITIES	20th

KNU AT A GLANCE

A student-centered university

34,812 Students received scholarships

1,000 Extracurricular programs in KNU CUBE Integrated Management System

Government-Funded Projects — Over KRW 538 Billion in Funding

Regional Innovation Project
(KRW 331.6 billion)
Strengthening local government–university cooperation

BK21 Graduate School Innovation Support
(KRW 53.6 billion)
Enhancing graduate research and innovation

National University Development Project
(KRW 76.3 billion)
Advancing institutional competitiveness

LINC 3.0 Program
(KRW 33 billion)
Fostering industry–university partnerships

University Innovation Support Project
(KRW 32.9 billion)
Promoting academic excellence and modernization

Regional Leading University Development
(KRW 10.6 billion)
Cultivating local leadership and talent pipelines

On-Campus Health Clinic and Medical Benefits

10 Types of vaccinations
04 Types of medical tests
02 Free health check-ups

KNU Community Engagement

- Carbon-Neutral Art Contest and Eco-Friendly Campus Festival
- Intergenerational and Cooperative Programs promoting inclusion
- Cultural & Art Events, Author Lectures, and New Year's Concert
- Living Lab and Youth Forum, addressing local issues
- Free Sports Programs benefiting over **1,000 participants** across campuses

Conducting World-Class Research

21 Papers published in **JCR Top 1%**

0.65 Highest SCI-Level **Research Paper Performance** per professor

1,251 **Full-time faculty members** enrolled

1,141 **Patent applications** and registrations

KRW 3.0 billion **Technology** transfer revenue

19,889 Number of papers

6,636 Number of internationally co-authored papers

33.37% Percentage of internationally co-authored papers

520,761 Number of Korean publications 2020–2024

19,889 Number of KNU publications 2020–2024

3.82% KNU publications as a percentage of Korean publications 2020–2024

8th Rank among Korean universities by number of publications 2020–2024

1.13 Field-weighted citation impact 2020–2024

30.60% Publications in top 10% journal percentiles

1.58% Scholarly output cited by policy

7.32% Number of policy documents citing KNU publications used in this SDG 2020–2024

146 Number of countries represented by non-Korean co-authors 2020–2024

END POVERTY IN ALL ITS FORMS EVERYWHERE

1 NO POVERTY

"Vietnam is among the world's top three rice exporters. We aim to develop international-level technologies to valorize grain byproducts and open new pathways for growth in the global agri-food industry."

Professor Ui Wook Hwang | Director
Korea Herb-Bio Convergence Promotion Institute

37
Scholarly output

430
Citation count

26
Publications

RESEARCH

Korea Herb-Bio Convergence Promotion Institute signed a four-party memorandum of understanding (MOU) with the Cuu Long Delta Rice Research Institute (CLRRI), KMF, and KIOT to advance international food tech research.

This collaboration focuses on:

- Upcycling grain byproducts
- Sharing databases on their components
- Conducting R&D for upcycling technologies and promoting their transfer and commercialization
- Fostering and advancing the global food tech industry

Furthermore, we strive to support regional small and medium-sized enterprises (SMEs) and create job opportunities by being a part of government-supported projects and initiatives.

STUDENTS

Supported by the government and the city of Daegu, our **1000 won Breakfast Program** has been running year-round since 2021. This year, with assistance from iM Bank, the program covered the summer break for the first time, providing affordable and nutritious meals to students, with an average of **238 breakfasts served daily last year.**

PUBLIC ENGAGEMENT

As part of our year-long social development program (April–December 2025), we created meaningful opportunities for students to engage with local children and adolescents through shared campus activities. On June 18, 15 middle and 4 elementary school students from the **Andante Growth Class** joined our College of Education students to run an **encouragement booth.** Co-organized with the **Department of Education and a local welfare center,** the event fostered **empathy, teamwork, and community ties** through collaborative learning and interaction.

ZERO HUNGER THROUGH SUSTAINABLE FOOD SYSTEMS

2 ZERO HUNGER

"We wanted to present a leading example of developing eco-friendly materials by utilizing agricultural and food byproducts, such as rice husk, as sustainable resources."

Dr. Young Hoon Jung | Professor
School of Food Science and Biotechnology, KNU

403
Scholarly output

5,246
Citation count

1.44
Field-weighted citation impact

RESEARCH

Professor Young Hoon Jung and his team at the School of Food Science and Biotechnology at KNU have developed an **eco-friendly process** to produce **biodegradable chitosan-based composite films** using **rice husk**, a byproduct that makes up 20–25% of rice.

Key features:

- Utilized biorefinery platforms to produce bioethanol and nanofibers
- Developed films with improved durability and mechanical strength
- Applications extend to food packaging, medicine, cosmetics, and construction
- Findings published in the *Journal of Bioresources and Bioproducts* (Impact Factor: 20.2, JCR Top 2.2%)

This innovation demonstrates the **valorization of agricultural waste** for sustainable food and material solutions.

STUDENTS

Integrated MS/PhD student **Byoung-Hoon Yoon** won the **Ministry of Science and ICT Award** for pioneering research on **chronic colitis treatment** using ***Chromolaena odorata***, a tropical and subtropical plant. This is the first study worldwide to prove that **flavonoid-rich extracts** reduce inflammation and strengthen antioxidant defenses. Supported by funding of **20 million KRW**, this research shows potential to **enhance farmers' income** and **develop functional health materials,** linking agriculture to health innovation.

12,600
briquettes delivered to 42 families

₩20 million
student grant for food research

PUBLIC ENGAGEMENT

KNU strengthens community ties through the **"Love Briquette Delivery Volunteer Service,"** delivering **12,600 briquettes** to **42 underprivileged families** in Daegu with support from over **150 student and faculty volunteers**. Since **2013**, this initiative has provided **warmth**, **energy security,** and **solidarity** to vulnerable households. Students expressed pride in supporting neighbors and embodying the **value of sharing.**

PROMOTING GOOD HEALTH, NURTURING WELL-BEING

3 GOOD HEALTH AND WELL-BEING

"Our study confirms the high potential of targeting PDK2 as a therapeutic strategy for osteoarthritis. In the absence of a cure, these findings may provide important clues for the development of new therapies."

Dr. Seungwoo Han | Professor

Cell & Matrix Research Institute, School of Medicine, KNU

4,175
Scholarly output

53,748
Citation count

1.32
Field-weighted citation impact

RESEARCH

Professor Seungwoo Han's team at KNU School of Medicine has discovered a novel metabolic mechanism, which inhibits **osteoarthritis progression** by regulating the enzyme **pyruvate dehydrogenase kinase 2 (PDK2).** Using a PDK2-deficient mouse model, they demonstrated cartilage protection, reduced pain, and improved chondrocyte survival.

The findings revealed that PDK2 inhibition:

- Enhanced energy production and reduced oxidative stress
- Demonstrated protective effects on cartilage

Their findings were published in ***Experimental & Molecular Medicine*** (Nature's sister journal). This research highlights PDK2 as a potential therapeutic target for osteoarthritis treatment.

STUDENTS

A team of **four nursing students** from KNU published a children's book titled **"Hello Chemoport!"** to **ease pediatric cancer patients' fears** of chemotherapy. By **personifying the chemoport device** with friendly illustrations, they sought to **reduce anxiety**, offer **comfort and hope**, and **support children** through treatment.

The book was **launched on February 27, 2025**, at the Chilgok KNU Hospital, providing **encouragement and strength** to young patients.

2–12 years old
children offered rehabilitation support

10+ leaders
attended the KT Dream Classroom ceremony

PUBLIC ENGAGEMENT

KNU Hospital opened the **KT Dream Classroom Project** to support children with **hearing loss.** In partnership with **KT** and the **Community Chest of Korea,** the program provides **speech and hearing rehabilitation, play therapy**, and **educational activities** for children aged between 2 and 12 years. Utilizing KT's **AICT technology** and professional therapists, the project fosters **rehabilitation and social adaptation.**

This initiative strengthens health equity in Daegu and Gyeongbuk, ensuring that children with hearing impairments and their families receive **systematic and specialized care.**

TRANSFORMING EDUCATION FOR LIFELONG LEARNING

4 QUALITY EDUCATION

"We aim to raise entrepreneurship awareness, strengthen startup and faculty capabilities, foster university–industry collaboration, and become a global innovation hub through systematic planning."

Professor Seong Ho Kong | Director
KNU Startup Incubation Center

72
Scholarly output

246
Citation count

RESEARCH

KNU's **Startup Incubation Center** has been selected by the **Ministry of SMEs and Startups** for the **"Specialized Capability BI Cultivation Support Project."** This year, the selection process included **university–industry, industry-specific, and regional types,** with **25 organizations being selected.** KNU has established a **collaborative system** to **operate** and **support seven joint programs** that include:

- Mentoring students and pre-entrepreneurs at different growth stages
- Education for MVP creation and investment attraction
- IR pitching and TIPS linkage support
- Product localization and global buyer matching

These efforts aim to **strengthen entrepreneurial capabilities** and **foster innovation.**

STUDENTS

The **2025 KNU World Friends Korea ICT Volunteer Program** in Indonesia, led by **KNU SW Education Center** in collaboration with the **Indonesian Polytechnic University**, will engage **54 student volunteers** to implement AI and SW projects, advance **smart city solutions**, provide **digital education**, and showcase **Korean culture**. The program is **sponsored by KOICA** and organized by **NIA.**

25+
organizations supported by KNU's Startup Incubation Center

54 volunteers
participated in the 2025 KNU WFK ICT Program

PUBLIC ENGAGEMENT

To develop data analytics talent, KNU has launched the **K-MOOC course titled "Artificial Intelligence and Kaggle Analysis."** Selected under the **K-MOOC Digital Fundamentals Program (2024)**, the 15-week course, taught by **Professor Woong Kim**, integrates **AI theory with practical Kaggle projects**, including **exploratory data analysis, data pre-processing, model training, and performance evaluation.**

Offered **free of charge**, the course is currently in progress, providing students with **hands-on experience** in **real-world data analytics projects.**

EMPOWERING WOMEN FOR EQUALITY AND OPPORTUNITY

5 GENDER EQUALITY

"The financial support provided by the KNU Women Alumni Association represents the collective goodwill of KNU's female alumni and supports single mothers who are raising their children independently in difficult circumstances."

Dal-hee Lee | President
KNU Women Alumni Association

34
Scholarly output

224
Citation count

RESEARCH

The **SW Education Center** is conducting the **"Rediscovery of Creativity in Women with Career Interruptions and Intergenerational Collaboration through AI"** program with **The Association of Daegu-Gyeongbuk Women in Science and Engineering.**

With a group of **40 women**—20 with career interruptions and 20 seniors—the program uses **generative AI** for content creation, helping participants **rediscover creativity** and foster **intergenerational collaboration.**

Guided by Professor Sooyeon Lim, participants receive training, create original works, and present them at **public exhibitions** in Daegu and Gyeongbuk. The program strengthens **cultural, artistic, and AI literacy** while reflecting local history and culture.

STUDENTS

A former physics student at KNU, **Dr. Hyebin Jeon** has been appointed as a **researcher at NASA**, specializing in **experimental astroparticle physics**. She led the **HELIX project,** developed **GRAMS and TIGERISS detection systems**, and will join the **BESS-Polar cosmic ray experiments.** Dr. Jeon credits her undergraduate and graduate research for preparing her to excel in **cosmic ray studies.**

40 women
received content creation training using generative AI

₩12.45 million
donated to support single mothers

PUBLIC ENGAGEMENT

The **KNU Women Alumni Association** donated **KRW 12.45 million** to the **Gyeongbuk Social Welfare Foundation** to support facilities for single mothers, promoting **self-reliance and childcare**. Funds were raised through a **gallery concert** and active **participation of members.**

Founded in **1995**, the association continues contributing to **community development** through social initiatives and cultural events. The donation reflects the alumni's commitment to **supporting women** in challenging circumstances.

ENSURE **CLEAN WATER** AND **SANITATION FOR A GREENER FUTURE**

6 CLEAN WATER AND SANITATION

"The study on the superhydrophilic electrode presents a new approach to maximize hydrogen production by optimizing superhydrophilic electrodes, advancing Korean water electrolysis technology and its practical industrial applications."

Professor Sang-Il Choi
Department of Chemistry, KNU

525
Scholarly output

12,228
Citation count

1.99
Field-weighted citation impact

RESEARCH

A team led by Professor Sang-Il Choi at the Department of Chemistry developed a **superhydrophilic electrode** that **doubles the efficiency of hydrogen production**. Porous nickel–iron nanoparticles on titanium oxide nanotubes rapidly **remove gas bubbles** during water electrolysis, **enhancing performance and stability.**

Integrated with **an anion exchange membrane water electrolysis (AEMWE)** device, it achieved **high current density (1.67 A/cm² at 1.80 V)** and could be **operated stably** for **1,500+ hours**, offering a breakthrough for **large-scale green hydrogen production** and **fuel-cell applications.**

The research was funded by the **National Research Foundation of Korea**. The findings were published in the March online issue of *Nano-Micro Letters* (Impact Factor: 31.6, JCR Top 1.4%), a prestigious journal in nanomaterials.

2x production
compared to commercial electrodes

1,500+ hours
of high operational stability

STUDENTS

The **United Nations Student Association** of Korea actively promoted **SDG awareness** through seminars, volunteering activities, and **Model United Nations programs**. Students tackled issues, like **reducing inequalities (SDG 10)** and **sustainable consumption (SDG 12)**, gained practical problem-solving skills, and participated in community outreach, such as caring for stray dogs, fostering **global perspectives, collaboration**, and sustained **SDG engagement**.

PUBLIC ENGAGEMENT

KNU and Korea Fisheries Resources Agency signed an MOU to strengthen cooperation in the **marine and fisheries sectors**, promoting **carbon neutrality** and **ESG management.**

Key aspects of the MOU include:

- Joint climate change and blue carbon projects
- Human resource exchanges
- Collaborative research on education and policy
- Technology and information sharing
- Co-organizing major events, advancing sustainable marine and fisheries development in Korea

ESG: Environmental, social and governance

ENSURE **ACCESS** TO **CLEAN** AND **SUSTAINABLE ENERGY** FOR ALL

7 AFFORDABLE AND CLEAN ENERGY

"The study on high-performance MXene microsupercapacitors is significant as it enables large-scale fabrication of flexible MXene energy storage devices, combining high performance and durability for applications in wearable devices, IoT sensors, and e-skins."

Professor Yonghee Lee

Department of Nano & Advanced Materials Science and Engineering, KNU

1,328
Scholarly output

21,362
Citation count

1.41
Field-weighted citation impact

RESEARCH

A team of researchers from KNU, National Nanofab Center, and KAIST developed **high-performance MXene microsupercapacitors** on **8-inch flexible substrates,** advancing **energy storage** for **wearables** and **Internet of Things (IoT) devices.**

Key features of this device:

- Volumetric capacitance increased by 36%
- Retained 90.3% capacitance even after 10,000 bends
- Large-area fabrication enables 100+ devices per process

This technology offers **scalable, durable,** and **efficient energy storage**, paving the way for **mass production** of **flexible clean energy devices.**

The study was published in the ***Chemical Engineering Journal*** **(JCR Top 3%).**

STUDENTS

KNU students from the Department of Robotics and Smart Systems Engineering won **two awards for excellence** at the **Ministry of Science and ICT's Land, Sea, and Air Unmanned Vehicle Challenge** in both **Designated** and **Free Competitions,** showcasing innovative **drone detection, tracking, and neutralization technologies**, alongside solutions for **illegal drone countermeasures.**

3,000+
participants attended annual job fairs

Highest
retention rate in the country recorded by KNU

PUBLIC ENGAGEMENT

KNU organized its annual job fair which attracted over 3,000 **participants**. Programs included **recruitment consultations, career counseling** by alumni, and company briefings from firms, such as **Samsung**, **LG Electronics, and HD Hyundai**. The university's high employment rate and the proportion of students becoming **CEOs of eminent companies** highlight the **competitiveness and capabilities** of its students.

KNU Library and the **Youngnam Culture Institute**, in collaboration with the **Korea Calligraphy Association, Daegu Branch,** hosted a **special exhibition** featuring **153 Korean calligraphy works.**

PROMOTING DECENT WORK AND SUSTAINABLE ECONOMIES FOR ALL

8 DECENT WORK AND ECONOMIC GROWTH

"KNU and ETRI will strengthen industry–academia collaboration through joint research, technology transfer, and startup support to nurture local talent and build an innovation ecosystem aligned with regional industries."

Professor ChoonWook Park | Principal Investigator
Daegu–Gyeongbuk–Gangwon UNI-CORE Project Team

287
Scholarly output

4,970
Citation count

1.61
Field-weighted citation impact

RESEARCH

KNU and Electronics and Telecommunications Research Institute (ETRI) co-hosted the **"UNI-CORE Promising Technology Commercialization Seminar"** to foster industry research collaboration and economic growth.

Key highlights:

- Focus on commercialization potential of advanced technologies
- Participation of 120+ industry and research experts
- Fields: AI, robotics, healthcare, and semiconductors
- Support for startups, R&D, and investment linkages

This initiative strengthens **decent work opportunities**, promotes **innovation-driven growth,** and builds a **sustainable technology ecosystem.**

STUDENTS

KNU has gained **recognition** in the **biohealth field**, with students filing **36 patent applications** through the **IP Convergence Talent Development Project**. This success highlights the university's focus on **innovation, research, and intellectual property education,** preparing students to become future leaders in **biohealth technology and IP creation.**

100+
industry participants attended the briefing

36 patent
applications in Food & Biological Engineering

PUBLIC ENGAGEMENT

KNU's Industry–Academic Cooperation Foundation, led by President Gyu-Man Kim, has been re-selected as the supervising institution for the **2025 Re-Challenge Success Package Support Project** by the **Ministry of SMEs and Startups.**

Through this initiative, the university will run diverse **support programs** over the next four years to assist **startup re-founders** with **commercialization, mentoring,** and **networking**, strengthening their capacity to overcome past failures and achieve **sustainable entrepreneurial growth.**

DRIVING **INCLUSIVE** AND **SUSTAINABLE INDUSTRIAL GROWTH**

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

"We will focus on enhancing the region's science and technology innovation capabilities through university-research joint development of new technologies. Our aim is to revitalize regional innovation and foster local science and technology professionals."

Professor ChoonWook Park | Principal Investigator
Daegu–Gyeongbuk–Gangwon UNI-CORE Project Team

712
Scholarly output

9,776
Citation count

1.31
Field-weighted citation impact

RESEARCH

KNU, in collaboration with the Korea Institute of Industrial Technology (KITECH), developed an **advanced technology for electroluminescent devices** that simplifies display design while enhancing performance.

Key features of this technology include:

- Simplified patterning with uniform sub-pixel thickness
- Improved color purity and high luminance for outdoor display technologies
- Separation of optical and electrical functions for flexible design
- BT.2020 color gamut compatibility
- Applicable to OLEDs, QLEDs, micro-LEDs, OLEDoS, LEDoS, advancing micro-display and automotive displays

This breakthrough is expected to drive **next-generation micro-displays** and strengthen Korea's role in **innovative display technologies.**

STUDENTS

Nine KNU students showcased their **prototypes at CES 2024**, the **world's largest consumer electronics trade show** in Las Vegas, USA. Selected through the **Youth Global Exploration Team**, the students represented their innovative technologies in **autonomous driving, AI-based detection, and rehabilitation solutions**, highlighting their potential as **future tech leaders.**

PUBLIC ENGAGEMENT

The **Future Digital Convergence Scale-up UNI-CORE Project Team** has been launched to **strengthen university–research institute** collaboration in the **Daegu–Gyeongbuk–Gangwon region**. With participation from KNU, ETRI, and local experts, the unit will drive **joint R&D projects,** support **technology commercialization**, and foster **regional innovation.**

By building a **sustainable collaboration platform,** the project aims to enhance **science and technology capabilities,** create a **virtuous cycle of development**, and nurture **local professionals** for the future.

REDUCING INEQUALITIES FOR A MORE INCLUSIVE WORLD

10 REDUCED INEQUALITIES

"Through this forum, we hope to shed light on different aspects of Korean society that international students experience and discuss the challenges they face and the support they need. We will seek practical solutions that reflect the perspectives of international students to establish Korea as a global education hub."

Professor Ho Soo Kang | Director

Secondary Education Research Institute associated with the Teachers College of KNU

63
Scholarly output

384
Citation count

14
Publications in top journals

RESEARCH

The Secondary Education Research Institute associated with the Teachers College of KNU and the Global Teachers University (GTU) Project Team hosted a forum on "Korean Society from the Perspective of International Students" to highlight the **inclusion and challenges** faced by global learners.

Key features of the forum were:

- **First-hand experiences** of acceptance and exclusion
- **Diverse perspectives** on cultural and societal integration
- **Focus on practical solutions** for inclusivity

This initiative emphasized reducing **inequalities** by amplifying student voices, fostering dialogue, and positioning Korea as a **global education hub.**

STUDENTS

Students from the College of Nursing's 'Nurse In Us' club volunteered for medical work in **Vietnam and Cambodia**, collaborating with the **local medical staff,** and provided community health education.

Through activities such as CPR training, patient care, and awareness programs, they enhanced **nursing competencies**, promoted **goodwill**, and gained experience for becoming **future healthcare leaders** committed to building **international nursing capacity.**

4-way partnership
institutions collaborate for inclusive education

15 learners 15 mentors
one-to-one support for slow learners

PUBLIC ENGAGEMENT

KNU Community Contribution Center signed a **four-party business agreement** with **Korea Gas Corporation**, the **Ieum Development Support Center**, and the **Daegu Citizens Foundation** to advance the mentoring project **"Warm Learn-On(溫)."**

This initiative, part of the **National University Development Project**, engages university students as **mentors** for **slow learners**, **enhancing** their language, social, and adaptability skills, while fostering inclusive growth, community engagement, and sustained **support for marginalized groups.**

BUILDING **SUSTAINABLE COMMUNITIES** THROUGH **REGIONAL INNOVATION**

"In line with the Global University 30 project and Daegu's RISE system, the new Community Contribution Center will launch region-linked projects in Dongseong-ro and the Urban Convergence Zone. Guided by the slogan "More Action KNU," the university aims to foster a youth-friendly culture, drive sustainable urban revitalization, and support young researchers' settlement in the region."

Yuri Jang | Director

Community Engagement Center, KNU

386
Scholarly output

5,467
Citation count

1.3
Field-weighted citation impact

RESEARCH

Regional Innovation System Education (RISE) KNU Research Center hosted a forum to assess **regional talent development policies** and strategies for overcoming regional crises.

Key highlights include:

- Engagement of education policy makers and university leaders
- Focus on the RISE system for regional innovation
- Shared global practices on regional-university cooperation
- A four-party MOU for policy research collaboration was signed with the RISE Center at the National Research Foundation of Korea, the Research Institute of the Governors Association of Republic of Korea, and the Higher Education Research Institute of the Korean Council for University Education.

Such initiatives strengthen **sustainable communities**, fostering **co-growth between universities and regions** through policy support.

STUDENTS

The KNU **Electronic Information Device Project Group** created and delivered a 3D graduation album for visually impaired students at the graduation ceremony of **Daegu Gwangmyeong School**. Developed through collaboration among seven local industries, academia, and research institutions, the 3D graduation album helps visually impaired students experience **facial features through touch and voice playback**, promoting **memory preservation and innovation.**

7 cities
implemented the RISE project

4-party MOU
signed for policy research collaboration

PUBLIC ENGAGEMENT

KNU Community Engagement Center hosted the lecture **"Start Local, Think Global: Youth Reboot Daegu"** at **Dongsung-ro Street 55 Cinema** to promote **local entrepreneurship.** The event included talks, networking, and film screenings, engaging students, early-stage entrepreneurs, and officials.

Through the Dongseong-ro Open Campus Project, KNU fosters **urban revitalization, community collaboration,** and **youth-led innovation,** demonstrating the university's commitment to **sustainable regional development** and **local cultural promotion**.

REIMAGINING CONSUMPTION FOR FUTURE GENERATIONS

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

"The Green Culture Festival was organized as a cultural venue to learn about and enjoy eco-friendly activities on university campuses. We hope that it raised awareness of environmental issues among university students and citizens, and they have an opportunity to think about practical ways to take action."

Professor Changhwan Shin | Director
Community Engagement Center, KNU

431
Scholarly output

5,862
Citation count

1.27
Field-weighted citation impact

RESEARCH

Professor Jin-Hyuk Bae and team discovered a mechanism for modulating the optical path length in **eco-friendly, lead-free perovskite solar cells** to reduce environmental hazards of traditional solar materials.

Main findings:

- Investigated light interference and optical path modulation using theoretical modeling
- Designed optimized layers for high-efficiency solar absorption
- Displayed potential for commercial, sustainable green energy devices

Published in the ***International Journal of Energy Research*** **(JCR Top 1.5%),** this research showed that clean energy technology can be both **efficient and environmentally safe**.

STUDENTS

KNU students took part in the **"This is Lucky Eco!"** Green Culture Festival in the Ilcheongdam area, an event organized by the Dalgubeol Good Life Council to promote sustainable living. Eco-friendly booths featured **upcycling, natural cosmetics, and waste reduction activities**, promoting **environmental awareness, hands-on learning, and sustainable practices**.

9 organizations
collaborated for community eco-events

₩50 million
secured as funding to revitalize local shopping area

PUBLIC ENGAGEMENT

KNU's Seomun Club Alley was selected for the **"2025 Alley Shopping District Recovery Support Project"** organized by Daegu City and the Daegu Traditional Market Service Agency.

By using **empty storefronts as retro-themed exhibition spaces, and providing entrepreneurship support**, the project aims to enhance **community bonds, student engagement, and sustainable urban commerce**, preserving local culture while encouraging **responsible consumption**.

ART AND INNOVATION TO DRIVE CLIMATE ACTION

13 CLIMATE ACTION

"Art cannot solve climate change-related issues, but it can raise questions about how the 'environment' shaped by the current generation will alter our 'future' and gather diverse agendas. I hope the museum can serve as a space for discourse to prevent climate change from escalating into an irreversible crisis and further become an opportunity for visitors to reflect on the value of action."

Professor Cheolhee Cho | Director
Museum of Art, KNU

436
Scholarly output

8,095
Citation count

1.62
Field-weighted citation impact

RESEARCH

Professor Kyueui Lee's team from the Department of Chemistry developed an **eco-friendly flame-retardant coating** to prevent wildfires, inspired by natural polyphenols in plants.

Key insights include:

- Polyphenol-based coating that forms a **graphite barrier** at high temperatures
- Maintained durability in **70-day climate aging tests**, ensuring long-term protection

Published in ***Green Chemistry***, this breakthrough highlights a **sustainable wildfire prevention technology** with strong commercialization potential.

STUDENTS

On **World Environment Day**, KNU's environmental club **Saechorom** hosted a **climate crisis quiz campaign** at Ilcheongdam. Through interactive quizzes, eco-friendly giveaways, and carbon neutrality surveys, the initiative promoted **sustainable practices**, encouraging students to link environmental awareness with their **future careers and actions.**

100% survival
in trees coated with polyphenol-based flame-retardant coating

3x flame retardancy
than untreated wood

PUBLIC ENGAGEMENT

The KNU Museum of Art hosted **"The Sea Named Us" exhibition** between July 16 and October 31, emphasizing **climate action** and **sustainable coexistence**.

Led by artist **ByunKaka**, along with eight KNU students, it explored the human–nature relationships through media, installations, and civic engagement. Featured pieces included **Jaeyeop Jung's "Boundary of Contact,"** made from repurposed wood from previous exhibitions.

Additionally, programs like **intergenerational docent training** and community restoration program **Forest:Site,** connect youth, seniors, and marginalized groups, turning art into a platform for **climate discourse** and **community resilience**.

INNOVATING MARINE SAFETY THROUGH GLOBAL RESEARCH

14 LIFE BELOW WATER

"We developed an autonomous cleaning robot and a monitoring system to manage marine debris efficiently, which constitutes 80% of beach debris. Our system is capable of real-time viewing, prediction, and advancement of marine conservation."

Jiye Yu | Fourth-year student
School of Computer Science and Engineering, KNU

149
Scholarly output

3,874
Citation count

1.76
Field-weighted citation impact

RESEARCH

KNU and the Korea Advanced Institute of Science and Technology (KAIST) hosted a seminar on **unmanned aerial vehicle (UAV) technology** for advancing strategies toward **maritime accident response**, highlighting the importance of collaborating land, sea, and air unmanned vehicle technology.

Highlights of the seminar include:

- Participation of **30+ experts** from academia, industry, and the coast guard
- Focused on **underwater robots, drones, and acoustic signal research**
- Shared strategies for **information-sharing systems** under harsh sea conditions

Such research fosters innovative solutions for **search and rescue operations during an accident,** advancing sustainable collaborative technologies.

STUDENTS

KNU's Computer Science and Engineering students excelled at the **2024 Smart Maritime Logistics Competition**, winning the **Grand (1st) and Gold (2nd) prizes.** Their projects included a **digital forwarding service** for small export shippers and an **autonomous beach cleaning robot** to fight marine litter. These innovative solutions highlight youth-driven contributions to **sustainable marine logistics** and pollution reduction strategies.

30+ experts
attended the seminar on UAV technology

₩2 billion
secured for marine research

PUBLIC ENGAGEMENT

KNU was selected for an **international joint research project** under the Ministry of Trade, Industry, and Energy, focused on **autonomous robots for shipbuilding and marine industries.** Partnering with Samsung Heavy Industries, the Korea Institute of Machinery and Materials and the University of California, Los Angeles, KNU will be receiving funding of **2 billion KRW** over 3.5 years.

As the only Korean university involved, KNU strengthens **global collaboration** in robotics, showcasing how academia–industry partnerships can advance **innovation, safety, and sustainability in marine engineering.**

BUILDING RESILIENT FOREST ECOSYSTEMS

15 LIFE ON LAND

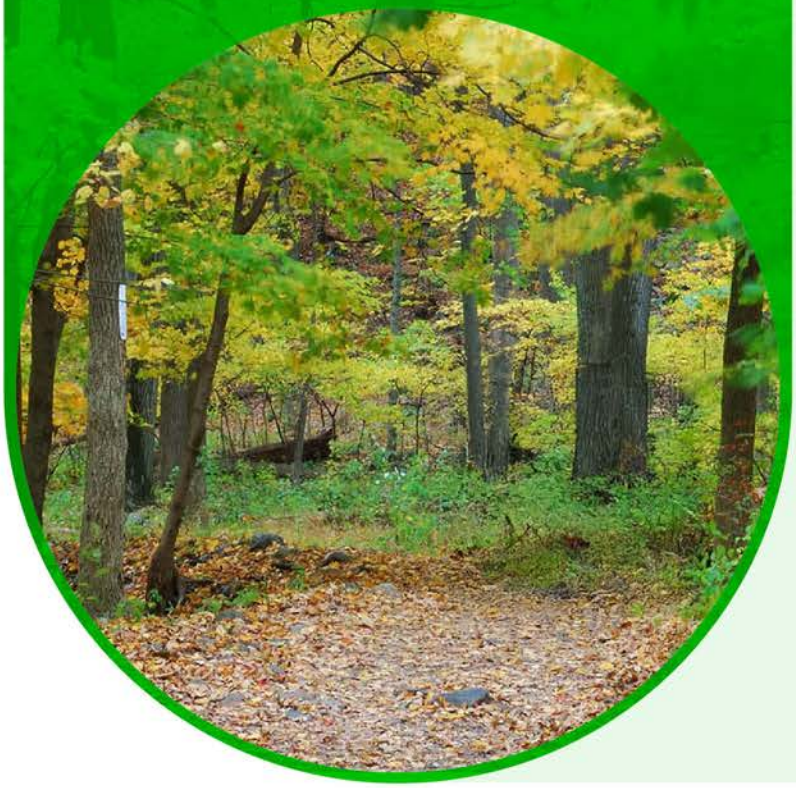
"Forest fires, landslides, and pests remain the top threats to Korea's forests. With Daegu and Gyeongbuk holding the country's largest forest cover, strengthening professional capacity in forest protection is vital for future resilience."

Professor Ki Woo Kim | Director
Tree Diagnosis Center, KNU

229
Scholarly output

3,663
Citation count

1.6
Field-weighted citation impact



RESEARCH

KNU Tree Diagnosis Center and the Forest Pest Response Field Customized Human Resource Development Project hosted an on-site forum on **"Precision Diagnosis of Pine Tree Decay"** to strengthen forest health.

Key highlights of the forum include:

- Minimally invasive tomography used to detect decay
- Hands-on training with real pine trees and sensors
- Graduate students and tree doctors gained diagnostic skills

This approach promotes **safer, healthier forests** by **detecting internal decay** without damaging trees, safeguarding Korea's cherished pine forests.

STUDENTS

The Department of Forest Ecology and Protection organized a field trip to the **Sangju City Forest Fire Suppression Support Center.** Students learned from experts, explored a **large wildfire suppression helicopter**, and studied **aerial firefighting systems**, enhancing **future professionals' capacity** in tackling Korea's top forest threats: **wildfires, landslides, and pests.**

2,380 hectares
damaged by pine needle gall midge

Largest forest cover of Korea:
Daegu City and Gyeongbuk

PUBLIC ENGAGEMENT

KNU in collaboration with the **Gyeongsangbuk-do Forest Research Institute,** Yeongcheon City hosted an on-site forum on the damage caused by the pine needle gall midge. The program featured a lecture on **eco-friendly biological control**, a **field study** examining gall formation on damaged pine needles, and the **collection of overwintering larvae** to assess infestation.

This initiative highlighted **research-driven pest management** and promoted **collaboration** among academics and local experts for sustainable forest protection.

BUILDING GLOBAL COOPERATION FOR PEACE AND JUSTICE

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

"Our overseas volunteer service is very meaningful because students practice the values of education and environment in the field and actively communicate with the international community. KNU will continue to broaden students' experiences in cooperation with the international community and conduct various activities for a sustainable future."

Young-Woo Heo | President
Kyungpook National University

66
Scholarly output

218
Citation count

RESEARCH

KNU Museum launched the **"Eurasian Silk Road Humanities Advanced Executive Program"** to train leaders with global humanistic insight.

Main features of the program include:

- **50 participants**
- **Duration:** 16 weeks, March to June 2024
- **Focus:** Silk Road studies with Asia's top academic resources
- **Target:** executives, government officials, and professionals from various sectors
- **Benefits:** completion certificate, research access, expert lectures, and field trips to heritage sites

The program aimed to strengthen **cross-cultural dialogue, leadership capacity, and institutional cooperation worldwide.**

STUDENTS

From July 13 to 25, 2024, **KNU Overseas Volunteer Group consisting of 22 members** joined citizens in **Ulaanbaatar, Mongolia,** to plant trees and promote the Korean culture. President Young-Woo Heo participated in planting trees and met officials to expand **student exchange and joint research.** The program reflects KNU's commitment to **education, environment, and international cooperation.**

50 experts
attended the 1st class of the Silk Road Program

16 weeks
Eurasian Silk Road Humanities Program

PUBLIC ENGAGEMENT

KNU's **Human Rights Law Center**, with the **Korea Legislation Research Institute**, hosted a **conference on "Digital Constitutionalism in the Age of AI"** on April 11, 2024. **Experts discussed** AI-driven decision-making, Article 22 of General Data Protection Regulation, the EU data law, and economic democratization in the AI era.

The event highlighted the need to **safeguard fundamental rights** and reimagine institutional design in the digital age, positioning KNU as a hub for **legal innovation and democratic governance.**

GLOBAL PARTNERSHIPS DRIVING REGIONAL AND CLIMATE INNOVATION

17 PARTNERSHIPS FOR THE GOALS

"We hope that the forum on regional talent development policy will serve as a foundation for fostering future human resources in the region and stably establishing the RISE system."

Professor Kyeong Eun Lee | Director
RISE Research Center, KNU

Key research areas

- Polar marine environments
- Carbon cycle research
- Northwest Pacific studies

Grand prize

won by students for "Yeosurok"

7 cities

designated as pilot regions for the RISE system in Korea

RESEARCH

KNU's G-LAMP Project Group, led by Professor Hyun-Shik Lee, signed MOUs with Germany's **Alfred Wegener Institute (AWI)** and China's **Tongji University** to strengthen international research collaboration.

The **AWI collaboration** focuses on **polar marine environments in the Arctic and Antarctic regions,** while that with **Tongi University** involves **carbon cycle research in the East Asian and Northwest Pacific seas.**

Key initiatives include researcher and student exchanges, **joint field sampling,** access to advanced laboratories, and **co-authored international publications**, positioning KNU as a center for **global climate and ocean research.**

STUDENTS

A student team from the Department of Tourism at KNU won the **Grand Prize** at the **Tourism Sciences Society of Korea Idea Contest,** part of the **96th Jeonnam–Yeosu International Conference.** Competing against **46 teams from 17 universities**, the team developed **"Yeosurok,"** a platform integrated with YeosuN for tourists to **record** and **share travel experiences**, earning the **first place** overall. The project highlights **regional tourism innovation** and **student creativity.**

2 international MOUs
signed for collaborative research

4-party MOU
signed for policy research collaboration

PUBLIC ENGAGEMENT

KNU's RISE Research Center organized a major forum on **regional talent development policies** at the Global Plaza, gathering **national policymakers, university leaders, and RISE centers.** The forum featured **analyses of regional–university cooperation models** and **case studies on shared growth and revitalization.**

A **four-party MOU** was signed to foster **policy collaboration**. Such initiatives strengthen **regional innovation ecosystems**, align **education with community needs**, and promote **co-growth** between universities and local governments.

Plastic Degradation Technology
A Key to Solving the Plastics Problem

The Challenge

Plastics are overproduced, overused, and barely degradable, causing severe environmental and health issues.

19 kg
of single-use plastics used per person per year

4.3 billion tons
greenhouse gas emissions by 2060

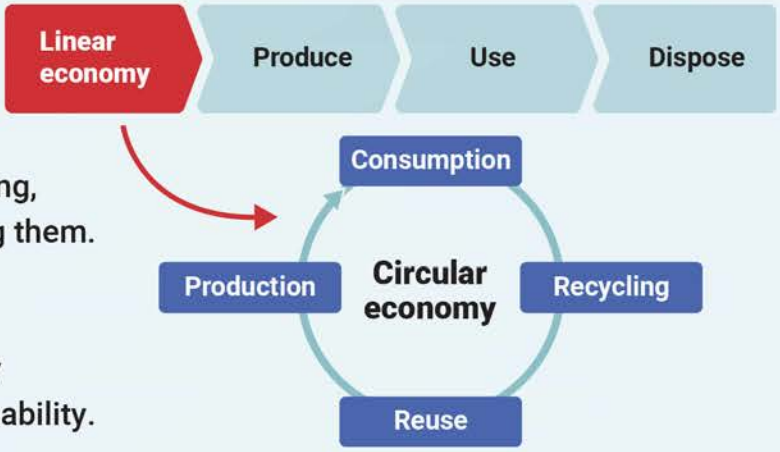
2.9 million tons
plastic waste discharged

$3.7–7.1 trillion
social cost of plastics produced by 2040

From Linear to Circular Economy

Achieving a plastic-free society means reducing, reusing, and recycling plastics, not eliminating them.

Transitioning from a **linear economy** (produce–use–discard) to a **circular economy** (reuse–recycle–repurpose) is a key to sustainability.



Innovation in Plastic Degradation

Super Enzyme (PETase + MHETase)
- Discovered in 2020 by University of Portsmouth & US NREL
- 6x faster PET degradation; enables infinite recycling

***Galleria mellonella* Enzyme**
- Found in honeycomb moth larvae (2017–2024)
- Cultured in yeast 6x faster basis for mass → production
- **Cytochrome P450** oxidizes polyethylene

Kubu-P Biocatalyst (2025, Korea)
- Degrades 90% of 1 kg PET in 8 hours
- Enables biocatalytic recycling with 50% lower emissions

"I believe biocatalysis is the ultimate solution to maintain economic viability in the plastics industry while adding environmental value."

— Dr. Hogyun Seo, Institute for Microorganisms

Times Higher Education
Impact Rankings 2025

KNU Ranked 3rd in the World 1st in South Korea

KYUNGPOOK
NATIONAL UNIVERSITY

SUSTAINABLE DEVELOPMENT GOALS

KYUNGPOOK NATIONAL UNIVERSITY

KYUNGPOOK NATIONAL UNIVERSITY
SDG REPORT 2025

Contact: eliseseo@knu.ac.kr | knurankings@knu.ac.kr
Web: https://home.knu.ac.kr./HOME/sdgs/index.htm
Location: Daehak-ro 80, Buk-gu, Daegu, South Korea