CAPPADOCIA UNIVERSITY
Logic - Wisdom - Equality - Tradition

SUSTAINABLE DEVELOPMENT GOALS • ANNUAL REPORT

Innovation shapes the future. Research connects communities.

SDG 9 / INDUSTRY, INNOVATION AND INFRASTRUCTURE



A year of scientific research, technical education, innovation and sector partnerships.

Cappadocia University | Reporting Period: 2025



Hands-on technical work involving unmanned aerial vehicles at Cappadocia University, 2025.

2025 • CAPPADOCIA UNIVERSITY • ENGLISH EDITION

2025 IN PERSPECTIVE

From research capacity to sectoral innovation

Our 2025 contribution connects scientific enquiry, applied learning and regional development.

Our 2023–2028 Strategic Plan provides the framework for strengthening research and development, improving teaching facilities, supporting scientific publication and making our expertise available through cooperation. During **2025**, we connected this framework with artificial intelligence and software projects, research on materials and energy technologies, aviation education and regional planning initiatives.

Selected results and activities in **2025**

Our approach to measurable impact

A policy-led innovation ecosystem

Areas of institutional contribution

Research & technology	Skills & infrastructure	Regional collaboration
Artificial intelligence, digital tools, advanced materials and six technical BAP projects	A computing faculty, technical laboratories, aviation training and scientific exchange	Public-sector planning, industry partnerships, sustainable standards and inclusive enterprise

PERFORMANCE DASHBOARD

2025 in focus

An overview of our documented research, learning and partnership milestones.

6	**7**	**20**
TECHNOLOGY BAP PROJECTS	**CODEDOCIA TEAMS**	**WOMEN ENTREPRENEURS**
Identified 2025 research initiatives	Applied student programming	ELEVATE initial cohort
4	**5**	**58 + 12**
NEW CLASSROOMS	**COMPUTER LABORATORIES**	**STRATEGIC OUTPUTS**
Computing faculty building	Learning infrastructure	Hatay policies and vision projects

Interpreting our 2025 indicators

The six identified technology-related BAP initiatives document fields of research rather than completed commercial technologies. Seven CodeDocia25 teams describe group project activity, while the first ELEVATE cohort included **20 women entrepreneurs**. The four classrooms and five laboratories relate to the new computing faculty building. The Hatay Tourism Master Plan comprises **58 policies** and **12 vision projects**, which are strategic outputs rather than completed investments.

Research, skills and public value

We interpret these outcomes separately: investment in educational infrastructure, student participation, organised research initiatives and jointly developed regional strategies represent different dimensions of our contribution to sustainable industry and innovation.

INSTITUTIONAL APPROACH

Innovation within our University mission

Our research policies, academic governance and applied-learning model support responsible development.

New capacity in computing and information technologies

On 15 May **2025**, Presidential Decree No. 9818 provided for a revised academic structure including our Faculty of Computer and Information Technologies. The faculty brings information technologies and computing-related programmes together within an institutional setting for software development, information security, digital systems and artificial intelligence education. We regard this development as an expansion of our long-term capacity, rather than a completed research outcome in itself.

Strategic foundations for research and innovation

Our 2023–2028 Strategic Plan joins education, research and development, University management, community engagement and sustainability within a common institutional strategy. We strengthen research capacity through our Scientific Research Projects Commission, project-management arrangements, research and application centres, specialist academic units and relationships with public institutions and industry.

Knowledge transfer and responsible innovation

The Project Management Office, BAP mechanisms and our academic departments provide a route for identifying partners, preparing research proposals and pursuing collaboration across universities, government and industry. We also maintain international academic connections, including cooperation with Azerbaijan State Oil and Industry University and other institutions, and sustainability-related projects supporting cross-border exchange. These relationships broaden the range of expertise available to our researchers and students.

ACADEMIC INFRASTRUCTURE

New capacity in computing and information technologies

We are developing environments in which digital research and applied education can advance together.

Our **2025** institutional facilities record also identified 48,949.81 m² of enclosed space across our University. This is a university-wide infrastructure measure; we do not present the entire area as newly constructed during **2025**.

02 / RESEARCH AND DEVELOPMENT

Digital research, advanced materials and applied engineering

A stronger practical learning environment

15 MAY	4	5
2025 DECREE	**CLASSROOMS**	**COMPUTER LABORATORIES**
Faculty establishment	New faculty building	Digital teaching capacity

We distinguish institutional infrastructure from construction completed during the reporting period. The recorded 48,949.81 m² of enclosed university space is an institutional stock measure and is not presented as an amount newly built in **2025**.

RESEARCH & DEVELOPMENT

Technology research supported through BAP

Projects span software, advanced materials and practice-oriented technical education.

AI-enabled services and software research

Project reference	Documented field of research	Intended application
KÜN.2025-BAGP-021	Software development and artificial intelligence research	Developing applied digital research capacity
KÜN.2025-BAGP-019	CustomGPT-based student assistant web application	AI-enabled support services
KÜN.2025-BAGP-014	Yb_2O_3-doped Bi_2O_3 solid-electrolyte composite materials	Energy-related advanced materials
KÜN.2025-BAGP-015	Tourism-data smart assistant based on a Turkish language model	Data-informed sector services
KÜN.2025-BAGP-027	Aircraft tubing system training set	Practice-oriented aviation education
KÜN.2025-BAGP-028	Aircraft component disassembly training set	Engineering skills and technical training

Project portfolio and responsible interpretation

Our project portfolio supports capability in data-driven services, materials science and aviation training equipment. We describe each project by its documented subject and intended application; a project identifier does not by itself establish completion, commercialisation or demonstrated social impact.

RESEARCH PATHWAYS

Digital systems, materials and applied engineering

Different technical fields reinforce our capacity for research-led innovation.

AI-enabled services and software research

Materials science and technical learning infrastructure

03 / SKILLS AND SCIENTIFIC EXCHANGE

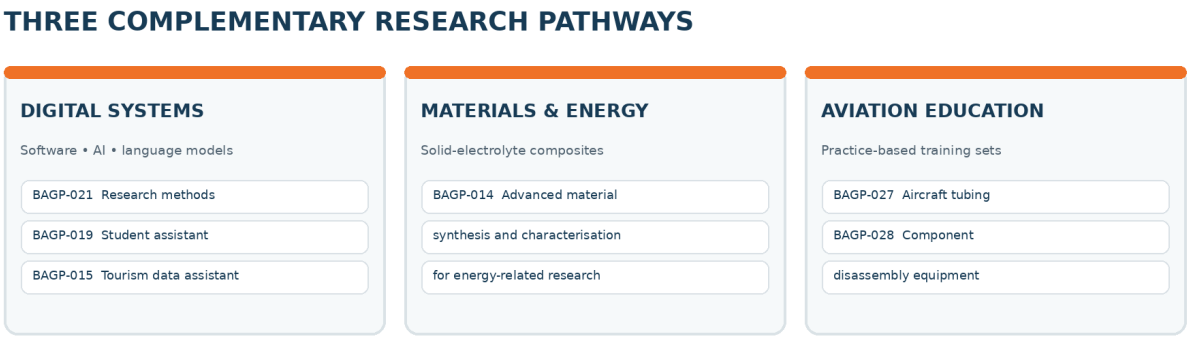


Figure 1. Our 2025 technology-related BAP portfolio, grouped by digital systems, materials research and aviation training infrastructure.

INNOVATION & SCIENTIFIC EXCHANGE

Connecting students with emerging technologies

Our 2025 programme joined software training, team-based problem-solving and academic dialogue.

CodeDocia25: applied programming and data science

The Second National Artificial Intelligence Meeting

Aviation technology in practice



Figure 2. Participants at the Second National Artificial Intelligence Meeting, 16–17 October 2025.

AVIATION TECHNOLOGIES

Applied learning within technical industries

Simulation, equipment development and industrial visits connect knowledge with professional settings.



Figure 3. FPV drone simulation training announcement issued for 28 March 2025.



Figure 4. Technical visit to the Pasha Balloons manufacturing facility, 14 March 2025.

TECHNICAL SKILLS

Sector-relevant learning in 2025

Our education activities introduce students to emerging technologies and real-world applications.

Partnerships that turn research into applicable knowledge

2025 activity	Date	Recorded participation
Dynamics of Technological Entrepreneurship	6 January	52
TEC Technical Visit	8 January	47
AI-Assisted Virtual Reality Applications in Rehabilitation	11 April	81
Digital Applications in Dental Prosthetics Technology	12 April	66
New Technologies in Radiotherapy	19 April	79
Play to Start-Up: Entrepreneurship in the Digital World	22 April	52
SkyForum: Future Leaders in Aviation	7 May	109

From classroom learning to professional practice

Participation figures are drawn from the individual activities and do not represent a verified number of unique participants across all events. These activities complement our formal teaching by introducing technical processes, professional perspectives and current research questions in entrepreneurship, aviation, rehabilitation and healthcare technologies.

RESEARCH PARTNERSHIPS

Industry and public-sector collaboration

Our research priorities are strengthened through cooperation with professional and governmental partners.

A research cooperation framework with MTA

In October **2025**, we established a scientific and technical cooperation framework with Türkiye's General Directorate of Mineral Research and Exploration (MTA). The agreement brings together our expertise in research, consultancy, training and data-related methods with the Directorate's scientific information, technical infrastructure and field experience. The identification of potential mineral sites using AI-based methods was named as a priority area for further joint work. The agreement is a formal basis for collaboration, not a claim that the planned exploratory methods had already produced operational results.



Figure 5. Signing of the scientific and technical cooperation protocol between our University and MTA, October 2025.

Aviation industry and technical career pathways

Our cooperation with aviation employers supports industry-aligned learning, exposure to professional standards and vocational progression. In **2025**, our arrangements included work with SunExpress concerning aircraft-maintenance technician career development and discussions with T&T Ercan Airport Management on education-related cooperation. We connect these relationships with our practice-based courses and technical training activities, while recognising the difference between an agreement, a training placement and a completed employment outcome.



Figure 6. Institutional meeting with T&T Ercan Airport Management concerning aviation education cooperation.

REGIONAL DEVELOPMENT

Evidence-based strategies for resilient economies

Our research-based planning connects public institutions, local stakeholders and sectoral needs.

Our Social and Strategic Studies Application and Research Centre connects the methods of academic enquiry with strategic planning, sustainable tourism, economic development and regional decision-making. Through participatory workshops and work with public authorities, we seek to turn data and stakeholder knowledge into policy options, action priorities and shared development agendas.

Regional initiative	Documented 2025 activity	SDG 9 connection
Hatay Tourism Master Plan 2025–2030	Presentation in March; 58 policies and 12 vision projects	Research-informed reconstruction and regional strategy
Amasya Tourism Master Plan	Stakeholder workshop, 21 July	Participatory destination planning
Artvin Tourism Master Plan 2026–2030	Development workshop, 29 September 2025	Long-term regional transformation and stakeholder input
Mardin and Konya planning work	Consultation and strategic-development activities during 2025	Integrated regional and sectoral planning
Kayseri Tourism Master Plan 2025–2030	Public-sector presentation and review in November 2025	Evidence-based guidance for regional priorities

The Hatay plan's **58 policies** and **12 vision projects** are two types of strategic output within the same planning framework. They should not be interpreted as 70 constructed facilities, completed investments or separately funded projects. Likewise, plans whose target years extend beyond **2025** are presented here for the work undertaken during **2025**, not as completed future actions.



Figure 7. Stakeholder workshop for the Artvin Tourism Master Plan 2026–2030, held on 29 September 2025.

SUSTAINABLE SECTORS

Digital capability and responsible sector standards

We connect international sustainability frameworks with local knowledge, enterprise and participation.

International criteria and professional practice

Through our Centre for Social and Strategic Studies, we contributed during the 2024–**2025** academic year to work on Global Sustainable Tourism Council criteria for visitor attractions and meetings, incentives, conferences and exhibitions (MICE). These frameworks address resource management, accessibility, local economic benefit, transport and the protection of natural and cultural assets. Our contribution connects international standards development with conditions for implementation in Türkiye's tourism and events sectors.

ELEVATE: women entrepreneurs and digital recovery

We participated in the British Council-supported ELEVATE project with the University of Wolverhampton, Hatay Mustafa Kemal University, CARE International and other partners. The first training group began in Hatay on 7 October **2025** with **20 women entrepreneurs** affected by the 2023 earthquakes. The programme introduced digital business skills, e-commerce, marketing and practical approaches to rebuilding enterprise activity. This **2025** milestone represents the programme's launch and initial cohort, rather than outcomes from its subsequent implementation period.

The connection to SDG 9 lies in the enabling infrastructure of skills, digital tools, reliable information and sector networks. By making these capabilities more accessible to local enterprises, we support conditions for innovation and economic participation without overstating the short-term effects of training.



Figure 8. Participants in our collaborative capacity-building activities for sustainable enterprise and sectoral development.

RESEARCH & SCHOLARSHIP

Innovation research across disciplines

Selected 2025 scholarly outputs include studies on fuels, sensing, engineering, materials and infrastructure.

We disseminate scientific findings through scholarly publications, conferences and research networks. Selected **2025** publications from our academic inventory illustrate the breadth of work connected to engineering, sensing, fuels, materials, algorithms, spatial planning and infrastructure resilience. These are bibliographic examples, not an institutional total of SDG 9 publications.

Selected peer-reviewed publications · Part I

Alternative fuels and combustion: Alabaş, B., Taştan, M., Özcan, A. & Arenillas, I. A. (2025). "Flame characteristics and emission behaviors of JP8 biogas mixtures under external acoustic enforcement frequencies." Fuel, 388, 134516. DOI: 10.1016/j.fuel.2025.134516.

Hydrogen and image-based combustion analysis: Alabaş, B., Kümük, O. & Özcan, A. (2025). "Investigation of the effect of colorless distributed combustion method on the flame of methane hydrogen fuel mixture using image processing method." International Journal of Hydrogen Energy, 116, 312–322. DOI: 10.1016/j.ijhydene.2025.03.026.

Aviation engineering: Alabaş, H. A. (2025). "CFD study of jet fuel with ammonia - Hydrogen mixtures in a jet engine: Emissions and combustion characteristics analysis." International Journal of Hydrogen Energy, 142, 140–150. DOI: 10.1016/j.ijhydene.2025.05.306.

Environmental sensing: Dal, E. K., Güneş, A. & Kılıç, R. (2025). "An Innovative Multiparametric Sensor Design for Detecting Microplastics and Heavy Metals." Elektronika ir Elektrotechnika, 31(2), 15–31. DOI: 10.5755/j02.eie.40069.

Green synthesis and innovative materials: Sarı Gençağ, B., Kahraman, K. & Ekici, L. (2025). "Green synthesis of silver nanoparticles from pomegranate peel and their application in PVA-based nanofibers for coating minced meat." Scientific Reports, 15, 17083. DOI: 10.1038/s41598-025-95349-4.

RESEARCH & SCHOLARSHIP

Infrastructure, algorithms and sustainable planning

Our publication examples show how engineering and computational research interact with resilience.

Selected peer-reviewed publications · Part II

Earthquake-resilient infrastructure: Karahan, S., Posluk, E., Büyükdemirci, F. B. & Gökçeoğlu, C. (2025). "Re-design of a railway tunnel intersected by surface rupture of the Erkenek fault segment during the 6 February 2023 Pazarcik (Mw 7.7) Earthquake (Türkiye)." Bulletin of Engineering Geology and the Environment, 84, 198. DOI: 10.1007/s10064-025-04217-y.

Algorithms and signal recovery: Yolaçan, E. (2025). "Convergence of iterative algorithm for G-nonexpansive mapping with digraph: application on G-variational inequality problem and signal recovery." Applied Mathematics in Science and Engineering, 33(1), 2527099. DOI: 10.1080/27690911.2025.2527099.

Climate-responsive heritage management: Akbarishahabi, L. (2025). "Sustainable Management and Climate Adaptation in Historic Sites: Insights from Side Ancient City." A|Z ITU Journal of the Faculty of Architecture. DOI: 10.58278/0.2025.1143.

Land use and sustainable industrial planning: Akbarishahabi, L. (2025). "Environmental Sustainability and Land Use Decisions: Hürmetçi and KOIZ." PLANARCH – Design and Planning Research, 9(1), 55–66. DOI: 10.54864/planarch.1589525.

Cultural heritage and climate resilience: Akbarishahabi, L. (2025). "Climate crisis and cultural heritage management." International Journal of Human Capital in Urban Management. DOI: 10.22034/ijhcum.2025.2053525.1974.

These papers show complementary strengths: computational methods support digital systems; materials and sensing research addresses technological development and environmental monitoring; and research on transport, seismic risk and land use contributes to more resilient infrastructure and place-based decisions.

Dissemination of scientific knowledge

Our publishing and research structures also support the circulation of findings beyond specific projects. The Cappadocia Journal of Area Studies, academic meetings and our institutional research repository make interdisciplinary scholarship available for future analysis and exchange. We continue to connect such dissemination with research integrity, methodological quality and the practical questions encountered by institutions and communities.

UNDERSTANDING IMPACT

What our 2025 activities enable

We examine education, research and regional development through their own evidence and outcomes.

Our **2025** contribution to SDG 9 combined the development of capacity with direct academic and community-facing activity. The establishment of a computing faculty and completion of its teaching building strengthened the educational setting; BAP projects created organised routes for technical research; student events brought learners closer to practical technologies; and agreements with public bodies and sector partners established channels for future cooperative work.

These are related but distinct outcomes. Our reporting differentiates completed events and facilities, initiated projects, strategic plans and future implementation commitments. We do not treat the signing of an agreement as evidence of a delivered technology, or an educational attendance record as a unique employment or enterprise outcome.

Priority areas for continued development

We will continue to strengthen the documentation of project milestones and outputs; improve the connection between technological research and measurable application; develop practice-based partnerships and work-based learning; evaluate learning outcomes in specialist skills programmes; and use research evidence to support responsible infrastructure and regional development. Our focus is on maintaining a credible chain from institutional commitment to implementation, measurement and public benefit.

How we distinguish outputs

Dimension	Documented example	Interpretation
Educational capacity	Faculty and teaching building; four classrooms and five laboratories	Infrastructure supporting practice-oriented education
Research programmes	Six identified technology-related BAP initiatives	Structured academic research activity
Skills and exchange	CodeDocia25, AI meeting, sector workshops and visits	Opportunities for applied learning and technical dialogue
Policy and regional strategy	Hatay 58 policies and 12 vision projects; provincial planning	Strategic development and stakeholder participation

OUR CONTRIBUTION

Innovation that connects development goals

Technical knowledge, resilient infrastructure and inclusive skills reinforce wider sustainability priorities.

Innovation and resilient infrastructure are cross-cutting fields. Our SDG 9 activities contribute to wider sustainability objectives where technical learning, inclusive economic participation, energy research, regional planning and responsible production interact. The relationships below reflect identifiable **2025** activities, rather than a claim that each project directly measures progress against every related goal.

Connections with other Sustainable Development Goals

Related SDG	2025 institutional connection
SDG 4 • Quality Education	CodeDocia25, aviation simulation, technical training sets and sector-oriented learning
SDG 5 • Gender Equality	ELEVATE digital capacity-building for the first cohort of women entrepreneurs
SDG 7 • Affordable and Clean Energy	Advanced-materials research relevant to energy technologies
SDG 8 • Decent Work and Economic Growth	Entrepreneurship education, employment-related skills and sector cooperation
SDG 11 • Sustainable Cities and Communities	Regional master plans, strategic planning and resilient infrastructure research
SDG 12 • Responsible Consumption and Production	GSTC criteria and more accountable sector practices
SDG 13 • Climate Action	Climate-responsive spatial planning and low-impact technological research
SDG 17 • Partnerships for the Goals	Public-sector, industry and international university collaborations

Across these interconnected fields, we seek to align innovation with public value. Our University's **2025** activities demonstrate a commitment to advancing knowledge and technical capacity while remaining attentive to the social, environmental and regional consequences of technological change.