

Story of a Knowledge Platform: Center for Sustainable Development (CSD)

College of Arts and Sciences - Qatar University



Prof. Sami Sayadi
Director of the Center

Experimental greenhouse for hydroponic cultivation.

The Center for Sustainable Development was established in 2013 under the supervision of the College of Arts and Sciences to develop pioneering scientific research. Research programs have been developed in various disciplines to address key sustainability issues in Qatar. Today we meet Prof. Sami Sayadi, Director of the Center for Sustainable Development, to learn about the center and its contribution to achieving the Sustainable Development Goals.

Prof. Sami Sayadi, what was the purpose of the establishment of the Center for Sustainable Development? What is its mission?

The Center for Sustainable Development (CSD) aims to develop integrated and sustainable solutions to address the challenges posed by Qatar's rapid economic and demographic growth. Its purpose is to enhance the quality of life by promoting environmentally sustainable, economically viable, and socially acceptable practices. The CSD focuses on sustainability in environmental and natural resources, with key efforts in biodiversity conservation, water resource management, food and energy systems, and waste reduction through recycling. Its mission is to establish a knowledge hub that advances sustainable technologies through applied multidisciplinary research, aligning with Qatar's National Vision 2030. The Center's primary goal is to drive innovative research that supports government agencies, academia, private enterprises, and communities in implementing sustainable development practices. It prioritizes interdisciplinary collaboration in areas related to energy and environment, in complete alignment with Qatar University's (QU) core priorities and with the United Nations' sustainable development goals. To achieve this mission, the CSD fosters research clusters within QU, engaging industrial partners, students, and scholars across various fields. Additionally, it provides advanced research services to both the University faculty and external organizations, ensuring the integration of sustainability-focused initiatives into Qatar's development framework and contributing to sustainability efforts globally.

What are the main facilities available in the Center?

CSD has steadily expanded its facilities alongside its growing research activities. Initially, it operated three laboratories for Algal Technologies within the BCR Building at Qatar University, along with the Outdoor Algae Research Facility in Al Zubara. Over time, its infrastructure has grown to include four additional laboratories: one dedicated to the FWWS Program and another supporting the Biotechnology Program. Further extending its research scope, the CSD is actively involved in the Aquatic Fisheries Research Center in Ras Matbakh, under the Ministry of Municipality. Recently, large-scale initiatives have been introduced, including pilot-scale facilities in CAS. These include a greenhouse for pilot-scale

algae production, as well as another greenhouse designed for agricultural experimentation.

What are the specialized research programs that the Center adopts?

The CSD was established during the 2013-2014 academic year with the primary goal of conducting innovative research that integrates environmental, social, and economic sustainability. Since its inception, the Center has focused on key research areas related to Algal Technologies, then expanded its activities to Food and Water Security, Renewable Energy, Waste Management, and Social Sustainability. In 2023, the CSD adopted a new organizational structure, introducing five distinct research programs: *Food-Water-Waste Sustainability*, *Algal Technology*, *Biotechnology*, *Sustainable Renewable Energy*, and *Human Sustainability*.

Tell us about the most prominent research projects currently underway at the Center.

Below are the titles of 2 ongoing projects in CSD that have accomplished a high Technology Readiness Level of 5 to 6.

Sustainable and Cost-effective Production of Microalgae-based Superior Fish Feed in Qatar: This project focuses on improving fish aquaculture by developing high-quality, nutrient-rich microalgae-based fish feed.

Promoting Local Poultry Industry: Pilot-scale Cultivation of Algae-enriched Feed for Broilers and Omega-3 Egg Production: This initiative focuses on developing nutrient-rich algae-based poultry feed to support local poultry production.

Apart from the two, CSD is leading several additional projects on the development of biofertilizers and biopesticides (halotolerant bacteria-based biofertilizers, biopesticides for palm trees Nano-biofertilizers for improving crop production). Research is also being conducted on bioplastic production by Archaea sustainable solid waste management and plastics' circularity.

How has the Center improved and developed research performance and supported the strategy of excellence in research and development at Qatar University?

By expanding research clusters within the university, CSD can encourage innovations across diverse disciplines such as science, engineering, and economics which will contribute to groundbreaking,

applied research. Additionally, increasing funding for large-scale, high-impact projects and scaling successful pilot studies can strengthen Qatar University's leadership in sustainable solutions for global challenges. Integrating more advanced technologies and ensuring the alignment of research initiatives with national frameworks such as Qatar's National Vision 2030 and the SDGs will ensure that the research produced is relevant and impactful. Furthermore, investing in infrastructure, such as state-of-the-art laboratories and research facilities, and promoting knowledge-sharing platforms will facilitate collaborative, cutting-edge work.

What services does the Center provide to University students and the community?

Faculty members of the CSD play a vital role in supervising and co-supervising undergraduate and graduate student projects. Additionally, they serve as examiners for Master's and PhD Theses defenses and chair comprehensive exam committees. In addition, CSD faculty actively contributes to students' internship programs, playing a key role in offering students hands-on experience in critical areas such as algal technologies and applications, sustainable agriculture, and waste management. These internships provide students the opportunity to develop essential skills in critical thinking, problem-solving, data analysis, communication, and teamwork. CSD also provides access to facilities and research support for QU faculty, students, and students from local schools.

What innovative research applications has CSD accomplished?

The Centre has pioneered innovative research applications that address critical environmental challenges, aligning with Qatar's National Vision 2030 and the UN SDGs. The Center has made significant innovative contributions in the production of marine algae-based fish and animal feed, the development of biofuels and bio-lubricants, the production of

salt-tolerant bacteria-based fertilizer and Nano-biofertilizers, and the automated membrane filtration system for microalgae harvesting.

Does CSD have local and international collaborations?

Through its various programs, the Centre actively collaborates with various departments and colleges within QU. The CSD has active involvement with various industries such as AGRICO, Qatar Airways Catering Company, TotalEnergies, Shell, and ExxonMobil. It is also working jointly with government entities, such as the Ministry of Municipality, the Ministry of Environment and Climate Change, and Ashghal. In the academic sector, there are active international collaborations with the Center of Biotechnology of Sfax and Technopark Borj Cedria, Murdoch University, Sultan Qaboos University, University of Tsukuba, and others.

How has the Center contributed to achieving the Sustainable Development Goals in Qatar and the world?

The CSD is dedicated to advancing sustainability programs in the University and beyond, contributing to QU's goal of becoming a sustainable campus. Through ongoing collaborations, CSD supports the implementation of the QU 2025 Zero Waste initiative. The Center's research aligns with several UN Sustainable Development Goals (SDGs). It addresses Zero Hunger (SDG 2) through advancements in agriculture and novel food sources like algae. Clean Water and Sanitation (SDG 6) is tackled through efficient desalination and bioremediation strategies. Affordable and Clean Energy (SDG 7) is supported through biofuels and solar energy research. Additionally, Responsible Consumption (SDG 12) promotes a waste-less society and a circular economy. Climate Action (SDG 13) explores carbon capture, and Life Below Water (SDG 14) examines marine biodiversity conservation.

Microalgae cultivation station.

