Research & Innovation

Advancing Food Security through Floating Urban Farming Innovation

The Sustainable and Smart Floating Structure Solution (S^2FS^2) represents an innovative response to urban challenges such as land scarcity and climate change. Led by the research team from the Research Institute for Land and Space under the PolyU Academy for Interdisciplinary Research, this initiative has explored how floating platforms could complement land reclamation and create adaptable, climate-resilient urban spaces.

A key application of S^2FS^2 lies in the development of floating farms, which can integrate advanced agricultural practices such as hydroponics, aeroponics, and vertical farming. By alleviating pressure on conventional land-based farming, these systems hold significant potential to strengthen food security in densely populated cities like Hong Kong.

Beyond agriculture, the project also served as a platform for knowledge transfer and public engagement. It offered unique opportunities for students, farmers, and the community to learn about sustainable land management, climate-resilient agriculture, and ecosystem preservation.

Through combining research innovation with practical applications, S^2FS^2 demonstrates how floating solutions can contribute to greener, more resilient cities. It highlights the transformative role of research in shaping future urban ecosystems while advancing sustainable living practices.

Pioneering Precision Hydroponics to Tackle Nutrient Deficiencies

The Research Institute for Future Food under the PolyU Academy for Interdisciplinary Research, was awarded **over HK$3.5 million** to carry out a research project to address the widespread deficiency of calcium, iron, and iodine among Hong Kong residents through the development of biofortified hydroponic vegetables using precision nutrient solutions. Leveraging PolyU patented technologies and an indoor controlled-environment hydroponic platform, the project focuses on optimising nutrient forms and concentrations to enhance both the nutritional value and yield of commonly consumed vegetables.

In collaboration with **around 50 local hydroponic enterprises**, lab-developed techniques will be scaled up in pilot production facilities, with standard operating procedures established to ensure consistency and quality. Comprehensive evaluations including nutritional analysis, food safety, sensory quality, and intestinal absorption studies are being conducted, alongside investigations into nutrient retention after common cooking methods. To support knowledge transfer, technical workshops for industry partners and public education activities on food sustainability such as farm tours, tasting sessions, and seminars will also be organised.

By promoting healthy eating, reducing carbon footprints, and enhancing the competitiveness of local hydroponic produce, the project contributes as well to Good Health and Well-being (SDG3) and Climate Action (SDG13). Ultimately, it aims to foster sustainable agriculture, food security, and a culture of sustainable living in Hong Kong.

Teaching & Learning

Educating Next Generation to Support Local and Rural Farmers

PolyU integrates support for farming communities into diverse academic disciplines, combining scientific expertise, ethical practice, and community engagement to address food sustainability. In the Department of Applied Biology and Chemical Technology, the service-learning subject "Educating Rural Farmers on Healthier Food Production" enables students to work alongside farmers in Chinese Mainland and Hong Kong to improve agricultural productivity and promote sustainable practices.

Particularly, projects in Deyang, Sichuan have enhanced mushroom, fruit, and paddy crop yields, while partnerships with the Hongchi Association, an NGO in Hong Kong have strengthened local farming operations. Students have also organised workshops on digital agriculture and organic farming for local students in Sichuan and elderly participants in Hong Kong, benefitting farming households in both regions.

In a related initiative, the School of Hotel and Tourism Management incorporates community-focused thinking into the subject "Business Ethics, Social Responsibility and the Law". In exploring stakeholder management, students examine the importance of local sourcing, recognising how food supplies from local farmers and small businesses can contribute to sustainable tourism and strengthen rural economies.

Service-learning subject "Educating Rural Farmers on Healthier Food Production"

Through hands-on agricultural projects and critical analysis of supply chain ethics, students gain practical skills and broadened perspectives, preparing them to champion sustainable food systems that support both community well-being and environmental stewardship.

Enhancing Food Security through Student-Led Consultancy Solutions

A postgraduate team from the School of Hotel and Tourism Management applied their analytical and problem-solving skills to support Foodlink Foundation, a charity working with Hong Kong's hospitality sector to reduce food waste and combat hunger, where they conducted an in-depth consultancy project to help the organisation refine its strategy in a post-pandemic context. The team began with a detailed assessment of Foodlink's operations, strengths, and areas for growth. Site visits allowed them to observe the charity's food collection and distribution processes, while interviews with key stakeholders provided valuable insights into the challenges and opportunities within the sector. Meanwhile, comparative analysis of local and international food donation models further informed their recommendations.

Their final proposals addressed three strategic areas — operations, marketing, and fundraising — and included practical measures such as partnering with local schools, integrating smart technologies like food collection boxes and mapping tools, expanding the use of shared kitchens, and participating in high-profile community events to increase visibility. Overall, the project enabled students to develop consultancy expertise while delivering actionable solutions that can help Foodlink broaden its reach, strengthen community partnerships, and enhance its impact in addressing food insecurity in Hong Kong.

External Engagement

Reducing Waste and Rethinking Food Resources for Future Generations

In collaboration with the Consulate General of France in Hong Kong and Macao, PolyU continues its annual Sustainability Lecture Series with a timely focus on sustainable food systems. Supported by the Department of Food Science and Nutrition and the Research Institute for Future Food (RiFood), "Sustainable Food System: From Production to Waste Management" addressed the entire food cycle from food production and sustainable consumption to waste management, offering a comprehensive perspective on one of the world's most pressing sustainability challenges.

Academic and industry experts from France and Hong Kong engaged in dynamic dialogue and knowledge exchange on how societies can better steward food resources. Panel discussions explored sustainable farming and food innovation as the first step toward responsible consumption, while also examining how technology can transform food waste into valuable resources. Participants also visited the University Research Facility in 3D Printing and RiFood to witness how advanced technologies are shaping more resilient food futures.

By fostering global collaboration and raising public awareness of food waste reduction, the event encouraged collective responsibility for building fairer, more resource-efficient systems. Ultimately, it showcased how sustainable practices across the food chain can protect the planet, improve public well-being, and secure a nourishing future for generations to come.

Driving Improved Nutrition through Research and Advocacy

The Department of Food Science and Nutrition (FSN) continues to play a pivotal role in advancing evidence-based strategies for improved nutrition, particularly for vulnerable groups such as postpartum women. In collaboration with the Hong Kong Midwives Association, the department organised a cooking competition and award presentation ceremony to promote the role of plant-based food in supporting maternal health.

By comparing dietary data of postpartum women from 2014 and 2024, PolyU's researchers found encouraging increases in vegetable, dietary fibre, and vitamin A intake. However, many mothers still struggle with obesity and dyslipidemia, underscoring the urgent need for greater awareness and accessible dietary solutions. The competition helped bridge this gap by showcasing simple, nutritious, and appealing plant-based recipes tailored for postpartum diets.

The department also created space for public dialogue through a seminar that critically examined global sugar guidelines. The discussion emphasised the importance of evidence-based policymaking, highlighting the complex role of sugar in nutrition and food processing. It cautioned that overly simplistic restrictions may inadvertently encourage reliance on artificial additives, with unintended health risks. Such critical approach helps dissect the intricacies of diet, health, and consumer behaviour, ultimately contributing to stronger public health strategies.

FSN Cooking Competition Award Presentation Ceremony

Governance & Operations

Encouraging Sustainable Food Practices through Organic Urban Farming

PolyU continues to embrace the global urban farming movement by providing innovative and practical opportunities for the PolyU community to engage in sustainable food practices. Building on its long-standing initiative of organising organic farming on campus since 2015, the University has created spaces where students and staff can learn about sustainable agriculture, cultivate fresh produce, and enjoy the benefits of enhanced social interaction. An online sharing session entitled "Regrow Vegetables from Kitchen Scraps" was also held to provide practical tips on how everyday household waste can be transformed into new sources of fresh produce. These activities, which have engaged **around 200 staff and student participants**, not only encourage hands-on experience in growing chemical-free fruits and vegetables but also contribute to environmental sustainability, food security, and improved nutrition within the campus community.

Minimising Food Waste on Campus

PolyU was awarded a **Certificate of Continued Support for the Food Wise Hong Kong Campaign** by the Environmental Protection Department of the Government of the HKSAR. This recognition highlights the University's dedication to reducing food waste and encouraging sustainable habits within the campus community.