

Singapore's Food Security and Transformation of the Farming Sector

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**Dr Mohamad Maliki Bin Osman Minister, Minister for Education (Second) and Minister for Foreign Affairs (Second),
Members of Republic Polytechnic's Board of Governors, Singapore**



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While Food Security had always been a national priority for Singapore, recent global events have reinforced the importance of ensuring a safe, stable and sustainable food supply. As a land-scarce nation, Singapore imports most of our food. For Singapore to be more self-sufficient and resilient, we will need to increase the amount of locally-produced food and reduce our dependence on food imports so as to cushion the impact against supply disruptions. In 2019, Singapore set an ambitious goal: to produce 30 percent of its nutritional needs locally by 2030.

Since then, Singapore has made good progress in increasing its local food production, leveraging technology to establish new farms and adopting innovative farming methods. There is a growing need to transform and invigorate the agriculture sector, undergirded by a pool of skilled manpower as Singapore strives towards food resilience. This requires agriculture professionals to be equipped with the necessary skillsets while tapping on innovation and technology to optimise the use of limited farmland and enhance productivity.

Education and Training for Urban Agriculture

To better meet the growing demand for specialised agricultural skillsets in this growth sector, we are proud to have launched courses in this field, particularly for Continuing Education and Training (CET). In 2019, we launched the Diploma in Applied Science (Urban Agricultural Technology), and our inaugural batch of students graduated in May this year. I am happy to share that our graduates are now pursuing careers in agritech.

We have since expanded our range of offerings in 2021, such as the Specialist Diploma in Agriculture and Agribusiness, as well as short courses in Agriculture Technology, Agri-Food Tech for Start-Up, and Sustainable Agriculture.

The Greenhouse at Republic Polytechnic will play a greater role in addressing the needs of the industry. The 650 m2 facility comprises a naturally-ventilated greenhouse, a climate-controlled glasshouse and 12 container labs. The facility utilises the Internet of Things (IoT) for key features, such as remote monitoring across more than seven different growth systems. One of them is the high pressure aeroponic system, contributed by our close partner - Ripe Fresh.

The Greenhouse also features sustainable building elements such as building-integrated photovoltaics (BIPV) on the roof to generate electricity and the excess power generated are also specially stored in the facility. This reduces the draw down from our national grid. Furthermore, The Greenhouse has a dashboard that tracks sustainability goals and key statistics as well as a water treatment system to recycle spent nutrients to offset water usage.

Beyond its physical façade, The Greenhouse will also be a space for our students to learn, discover and build their agritech skills and knowledge. For example, a project team comprising students from the Diploma in Environmental and Marine Science, and supported by our industry partner B. Braun, designed and developed a multi-layer flow-dripper hydroponic system using upcycled medical waste. These systems can be deployed at therapeutic gardens located within hospitals and elder care homes. The Greenhouse will therefore benefit over 700 students each year, who are pursuing their Pre-Employment Training (PET) or upskilling as adult learners. It will provide them with ample opportunities for hands-on training in a realistic work environment, and also act as a nexus for industry partners and IHLs to explore collaboration opportunities.

Research and Development in Urban Agriculture

To support Singapore's 2030 goal, RP has made a concerted effort to drive food sustainability and agritech innovation by collaborating with our key industry partners. For example, we have been collaborating with Indoor Farm Factory Innovations (IFFI) to produce quality vegetables under controlled conditions through vertical farming. Relying on plant science and precision engineering, the farm is on track to achieve harvest yields of approximately 300 tonnes of vegetables annually. The project is supported by Singapore Food Agency's 2030 Express grant that enables local farms to improve their crop yield.

The ability to leverage skills and technologies across various domains such as artificial intelligence, automation and machine learning will therefore play a crucial role in alleviating the many constraints faced by Singapore's agricultural sector, in particular farm productivity.