

# **Developing Agriculture Technology Is a Necessary Step Towards Food Security**

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Since the outbreaks of the coronavirus pandemic and the Russia-Ukraine war, many countries have been faced with unprecedented challenges in maintaining the stability of supply chains and food security. By 2050, the world will have 10 billion mouths to feed. Add to that unforeseeable sporadic impacts on food supplies and the long-term effects of intensifying climate change on land and water sources, and agriculture worldwide will be put on a gruelling test, subjecting supplies of abundant and cheap foods to tremendous pressures. Since Hong Kong imports over 90% of its food supplies, food security for its population exceeding seven million will also be under threat in the long run.

Below is an analysis of the crucial technology in Hong Kong's future reindustrialization — agriculture technology (Agtech), which is a combination of agriculture and technology, making use of technology to create new ways of farming, e.g. indoor agriculture and sustainable food production integrating aquaculture and horticulture. Through state-of-the-art information technologies, including such solutions as the Internet of Things (IoT), sensors, robotics, artificial intelligence (AI), data analysis, etc., the quality and productivity of agricultural products are enhanced to alleviate the problems of labour shortage, water and land management, as well as pest control.

## **Agriculture as the holy grail**

To ensure food security, coordination among government departments is necessary to overcome all sorts of problems, ranging from economic policy to enhance food supply by raising farmers' incomes to public health policy to improve human nutrition by optimizing food use. However, at the end of the day, if agricultural production lags

behind the expected growth in global demand, the underprivileged will be affected first and foremost by rising prices of food and agricultural raw materials. Since the declaration of the Russia-Ukraine war, more and more poor nations have been plagued by food undersupply and famine.

In view of this, investors have made long-term preparations for the enormous challenges by investing in start-ups that could help to resolve the global food crisis. Horizons Ventures for one focuses on agriculture and synthetic-biology technologies, e.g. dairy-free ice-cream start-up Perfect Day and vegan-meat producer Impossible Foods. According to the data of the Plant Based Foods Association, despite the economic instability this year, American retail sales of plant-based foods, at a growth rate three times that of ordinary foods, have surged 54% over the past three years. In 2021, the plant-based market value peaked at US\$7.4 billion.

Investment in future foods is becoming popular among businesses throughout the world. In the UK, M&S has partnered with Infarm to roll out a range of fresh herbs grown in seven of its stores. The grocery technology business Ocado has invested £17 million in building its own vertical farms and growing medicinal herbs and vegetables alongside its distribution centres. These companies are looking to reach out to more consumers and influence their consumption behaviour so as to lower their carbon footprint.

Headquartered in Singapore, the Agtech company Sustenir grows foreign crops (e.g. strawberries and arugula) in indoor vertical farms, reducing reliance on food imports as well as carbon emissions during transportation. Complete with AI, big data, and LED lighting systems, farming under laboratory-controlled settings not only meets local demands but also helps to minimize food wastage. The start-up has recently expanded to Hong Kong, cultivating two types of kale in its farming facility in Tuen Mun.

As revealed by the Hong Kong SAR Government's statistics for 2017, of all the 4,400 hectares of agricultural land in Hong Kong, 3,700 hectares were derelict fields. To address the city's pressing development problem, it is imperative to make good use of the abandoned lands so that economic benefits can be reaped from them. When it comes to rebooting the local agriculture, the focus should be on urban agriculture

as part of Hong Kong's reindustrialization effort instead of depending on traditional agriculture again.

### **Towards a sustainable food system for future generations**

Amidst the emerging hydroponic farming technique in Hong Kong in recent years, Farmacy HK started off its business in a factory building where the tech enterprise has developed a fully environment-controlled smart mobile farming system, using just a freezer to produce various kinds of herbs and vegetables. Hydroponic planting consumes less electricity and less water, saving 90% water compared with traditional agriculture. Equipped with IoT technology with sensors to control lighting, air flow, and nutrition levels as well as provide around-the-clock remote monitoring of production, hydroponic farming is conducive to resolving problems with shortage of agricultural land and water resources.

The Controlled Environment Hydroponic Research and Development Centre (CEHRDC) – a joint initiative by the Agriculture, Fisheries, and Conservation Department and the Vegetable Marketing Organization – has been set up at the Cheung Sha Wan Wholesale Vegetable Market. Thanks to CEHRDC's study on advanced hydroponic technology, harvesting time is twice as fast as that for ordinary vegetables, with the process from sowing to harvesting taking only 21 days. However, buying and maintaining the machines that cost tens of millions of dollars are too much of a financial burden for small to medium enterprises and farmers. In order to balance the budget, the project focuses on ready-to-eat salad vegetables which sell for higher prices. Without adequate funding, expansion of operations is out of the question. Not only should the SAR Government provide investment for the above project and support for the sector but it should also set up smart Agricultural Priority Areas to ensure stable supplies of crops under progressively unstable weather conditions in future.

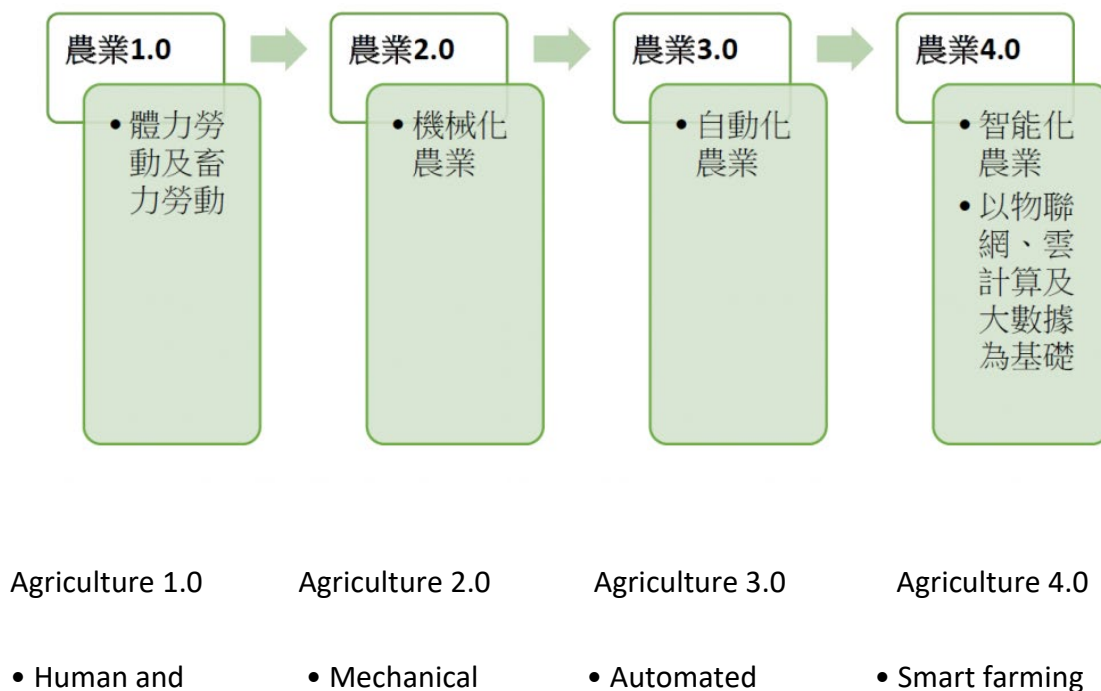
Local consumers are not merely becoming conscious of eco-friendly foods, responsible consumption, and corporate ESG (Environmental, Social, and Governance) but are also more aware of food sustainability. As the Hong Kong Consumer Council's sustainable consumption survey in 2020 shows, 87% of the

respondents are willing to pay an extra 5% or more for eco-friendly or sustainably produced products or services. However, over one-third of the respondents regard supply of such products in Hong Kong as insufficient. The biggest hurdles involved are “not enough information”, “too expensive”, or “not easy to acquire”. More active promotion by the Government will encourage more people to support and facilitate sustainable consumption.

To ensure sustainable economy, food security, and responsible consumption, Hong Kong policymakers should focus on finding ways to support Agtech, nurture talent, and provide platforms for aspiring innovators. This will help to diversify the local economy, ensure food security and achieve a scale of agricultural production large enough to meet the population needs in Hong Kong and the region. The realization of this vision will require the joint effort of the Government, the business community, agricultural stakeholders, green groups, as well as educational institutions.

**Figure The evolution of agriculture**

[圖] 農業發展進程



animal labour

agriculture

agriculture

- Using IoT, cloud computing, and big data