

Keep calm and carrot on: how agritech could transform farming in Singapore

What agritech entails, why investors are sitting up, and how it could transform farming in Singapore

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KEEP CALM AND CARROT ON: How agritech could transform farming in Singapore. BT ILLUSTRATION: SIMON ANG

THINK fast: which countries come to mind when you hear "agriculture"? China? Yes. Japan? Probably. Singapore? Not so much. The country has never had a large role to play in agriculture. Yet in the past two years, the authorities cannot seem to stop waxing lyrical about the potential of Singapore as an agrifood tech hub for the region, almost as if to say: There's so much we can do. Lettuce grow together.

But jokes asides, agritech is becoming serious business here. Just earlier this week, Enterprise Singapore (ESG) investment arm Seeds Capital appointed seven co-investment partners to pump more than S\$90 million into Singapore agrifood tech startups. The last year also saw notable movements within the private sector as well. Catalyst-listed Trendlines announced plans to open an innovation centre to develop agrifood technologies here, and wants to raise a US\$40 million venture fund. Global agrifood tech accelerator network The Yield Lab rode into town too, basing their regional operations in Singapore.

And yet when it comes down to it, most of us in Singapore might go our whole lives never being in the presence of a crops farm or livestock. A single mysterious wild cow on Coney Island - which has since died - was novel and exciting enough to gather a religious following.

So what does Singapore have to do with agriculture technology, and why is the buzz getting louder? Here's why you should even carrot all.

Nascent, but gaining traction

AgriTech refers to the use of technology in agriculture to improve yield, efficiency and sustainability. It is different from foodtech in that it involves innovation higher up the supply chain, and tends to be business-to-business instead of consumer-facing.

Categories of agriTech include biotechnology, farm management, novel farm management systems, and supply chain technology or marketplaces. So it could mean doing research into vaccines for fish in sustainable and traceable indoor farming, or growing vegetables on the rooftops of shopping malls, or developing cutting-edge technology to monitor operations in a farm.

In Singapore, the topic of agriTech has gained colour over the years because of push-pull factors. Globally, countries are facing challenges such as arable land scarcity, overfished oceans and resource constraints. Research has projected 37 per cent post-harvest losses in agricultural production by 2050 amid population growth and urban migration.

Though Singapore ranked top of the Global Food Security Index last year, more than 90 per cent of its food is imported, signalling heavy reliance on other countries. Innovation in food production has hence been touted as a possible solution to ensuring greater self-sustainability.

It is a nascent sector, but the interest in agriTech has already yielded some startups in Singapore. Sustenir, for instance, has perfected the art of growing strawberries - a cold weather crop - indoors right here. In February last year, VertiVegies clinched a land parcel in Yio Chu Kang from the Agri-Food and Veterinary Authority (AVA) to build nine six-storey modular structures to grow vegetables.

Not all of these startups are food-producing ones. "Agriculture doesn't equate to farming," Howard Tang, CEO and co-founder of Smart Animal Husbandry Care (SmartAHC), tells The Business Times. SmartAHC uses wireless sensors and a smart system to analyse a pig's health and readiness to breed, through movements in vital measurements such as temperature and weight.

The company currently has customers in five of the top 10 pig farms in China, home to the largest market for pork. But things were not always smooth-sailing - being in tech didn't take the toil and patience intrinsic to agriculture out of the experience.

The early days of SmartAHC involved prolonged trips by the founders to China to study pig farms there (to get their hands dirty, they had to first get squeaky clean - humans are a major carrier of viruses, which is detrimental to pig farms).

Back in Singapore, the earliest version of the sensors had to be inserted into the heads of dead pigs, which would then be shaken hard to see whether the device could stay put. It was only after establishing a small office in China with live pigs nearby that the R&D time for the prototypes significantly reduced.

Mr Tang says one of the biggest challenges in operating an agritech startup in Singapore is lacking the resources to understand the industry. He laments that a lot of attention is being given to the technology itself.

"Agriculture needs to come first; it shouldn't be the technology coming first," says Mr Tang.

For Upgrown Farming Asia, its industry experience of more than five years is its biggest selling point. Upgrown has clients in Korea, Japan, the Philippines and Vietnam, among others.

The company designs commercial indoor farms and greenhouses, providing their clients with system integration and agri-business consulting. Its products include a range of technology, from automation and climate control to data analytics and artificial intelligence, depending on the client's needs.

Founding director Lionel Wong tells BT: "The latest issue in urban farming, especially for new entrants, is how you sell your product. Marketing strategy is not so simple; farming is simpler."

For vertical farming projects, the cost of production can be quite high. Mr Wong recommends that indoor farms develop their own niche crop instead of competing with commodity suppliers. Players can also adapt a farm to the needs of a specific group of clients that are looking for an exclusive product.

Land of opportunities?

With Singapore increasingly gearing up towards agritech, a small number of foreign startups are beginning to turn their gaze towards the city in search of good fortune.

Isabelle Decitre is founder of Singapore-based Future Food Asia Platform, which helps startups connect with large corporations. She says the platform has seen 45 Singapore agrifood tech startups to date and about 230 across the Asia-Pacific in 2018. "Singapore is a place of highest repute to get funding from and conduct business transactions in, and this is definitely a big draw for startups," says Ms Decitre, who moved to Singapore from France in 2012 and established her agrifood tech venture capital firm ID Capital that year.

ID Capital is one of ESG's chosen co-investment partners. It invests in Series A rounds with ticket sizes ranging from US\$2 million to US\$5 million.

"If foodtech is the core focus, Singapore has also chosen two particular sectors in agritech: aquaculture and indoor farming. Both represent very high stakes for the country and there is still a lot of room for technology innovation," says Ms Decitre, echoing what Trendlines told BT back in November.

Examples of those dabbling in aquaculture are small-and-medium enterprise (SME) Apollo Aquaculture Group, and Japan and Singapore-based startup Umitron. SGX-listed Oceanus has also pumped significant capital into R&D for its abalone aquaculture operations.

At Indoor Ag-Con Asia this week, finalists in the running to bag S\$50,000 from ESG and substrates and technical advice from Smithers Oasis included startups from Israel and the US.

Two startups BT spoke to had travelled from their headquarters overseas to set up booths at Indoor Ag-Con. One of them, a startup from Tokyo called Farmship, is on the hunt for a partner to bring its container-based vertical farm to Singapore. Farmship already has a joint venture with a local enterprise in Indonesia.

Amid the flurry of activity in the startup scene, corporates and investors are oiling their gears too. According to agrifood tech VC firm AgFunder, global agritech investments in 2017 grew 24 per cent year on year to US\$4.2 billion.

Mainboard-listed paper mill firm Avarga said in June last year that it was acquiring a 23.08 per cent stake in urban farming tech solutions provider Archisen for up to US\$1.5 million. A few months later, Vanda Global Capital, Shenzhen Dayshine Fund Management and Raffles Capital announced they are launching a US\$1.5 billion Asia AgriTech Fund.

Temasek Holdings has made a few agritech investments as well, the most recent being its participation in a US\$90 million round in New York-based Bowery Farming, a two-year-old startup that uses robotics to cultivate crops indoors.

Temasek Lifesciences Accelerator (TLA) CEO Peter Chia tells BT that the firm just obtained its fund manager's licence and set up The Life Sciences Innovation Fund (TLIF) to inject seed funding into startups.

TLA is a joint venture between Vertex Ventures and Temasek Life Sciences Laboratory (TLL). It supports agritech startups by providing specialised wet lab spaces such as growth chambers, greenhouses and urban aquaculture facilities.

While the capital currently floating around in the agrifood tech space is limited, investors are of the opinion that it will pick up.

The amount of funding available in Singapore for agrifood tech is not more than S\$10 million, according to a ballpark estimate by Sirius Venture Capital founder Eugene Wong.

"However, because the government is keen on promoting this industry, I can envisage more incubators and early stage VCs coming to set up presence in Singapore," he says. "I think in the next two three years, there will be a tenfold jump in available funding."

For Openspace Ventures, the total addressable market size stemming from agrifood tech is a huge draw. Consultancy firm Frost and Sullivan said the global smart agriculture technology market generated revenue of US\$4.5 billion in 2015 and will reach US\$9 billion in 2020, growing at a compound annual growth rate of 14.8 per cent.

Openspace Ventures is the only sector-agnostic co-investment partner of ESG, and is rather known for being an early backer of Gojek.

The firm has made some undisclosed investments in agritech overseas. Founding partner Hian Goh says tech has sewn itself into the fabric of society, so it is natural that sectors like healthcare and agriculture will see change.

"We're looking at a revolution," says Mr Goh. "We want to encourage more people to use these kinds of fundamental technologies that were born out of the mobile phone revolution to apply to agritech." An interesting agritech startup will have a fighting chance to become a very large business, he adds.

Seeding pains

Still, challenges remain in this budding sector. Like most startups, agritech suffers from a lack of skilled talent. But the problem is exacerbated by the estrangement of the sector with Singapore. How many spare a glance at agriculture and see an opportunity to start a business?

Mr Wong pointed out that up till recently, agrifood tech-related courses were geared towards training students to do lab work for large companies like Nestle and Unilever.

"You need to instill an entrepreneurial spirit," says Mr Wong. "Programmes mixed with entrepreneurial skills are the best; we need to replicate what we did with ICT and fintech."

For now, agritech startups rely heavily on partnerships for relevant experience. Archisen, the startup that Avara invested in, works with local and overseas institutes for knowledge transfer and to identify and groom local talent.

And as it stands, Singapore's agriculture sector remains fairly fragmented.

Leo Wein is founder and managing director of Protenga, a Singapore startup that builds farming systems for black soldier flies in order to make insect-based feed for livestock, packed full of nutrients. He tells BT that when he first approached the authorities in 2016 regarding land to set up an R&D farm, he encountered some apprehension.

"They were not open to the idea that I wasn't farming produce, like vegetables," he says. "But insect-based feed is part of the ecosystem too; food waste is broken down by black soldier fly larvae, and the feed that we make enables farmers further downstream."

Protenga eventually established operations in Johor, while its headquarters remained here.

Singapore's understanding of agritech has matured since then, and Mr Wein is excited to establish a larger presence here.

But the ecosystem remains a work in progress.

Darren Ho, head of urban farm set-up Citizen Farm, says retailers in Singapore can be more open to communicating and working with local farmers instead of prioritising margins.

Citizen Farm currently sells its produce straight to consumers. In this vein, education about better food choices is something that resonates with many in the agritech sector.

Mr Wein, who also has experience developing edible insect products for humans, can't agree more. "People tell me that eating insects is so wild. You know what is wild? It's going into the supermarket, picking up a bag of food, looking at the ingredients list, and still putting that in your body."

As the country attempts to charge ahead with agritech, the government has turned its attention to local heritage farms as well.

Singapore is home to a small community of farmers, some of who are in the Kranji countryside, a 45-minute drive from town.

The authorities have been pushing for tech adoption in these farms, awarding grants for R&D and including an "innovation" component in its review of land tenders.

But Chelsea Wan, a second-generation farmer who heads Jurong Frog Farm, says money is not the only big concern for these farmers. Tech adoption also touches on the issue of labour and maintenance of new technologies, which farmers need more support for.

That said, she is a believer that local farmers need to be creative too, in order to edge out the competition. Her farm has worked with startups DeNova Sciences and Collagreen to spin off frog collagen skincare products. Collagreen was co-founded by Ms Wan; it processes agricultural byproducts for more advanced applications.

"You also do have to think out of the box. I think that would be what the younger generation of these family-owned farms are looking at," she says. "So it's not only pertaining to infrastructure or using tech in operations. It's also being innovative in your product offering and really knowing what you're selling."

Amendment note: An earlier version of this article stated that Protenga produces edible insect products for humans. The founder has since clarified that the company does not do so, but he has experience developing the products.