

Strategies to secure Singapore's food supply

Diverse sources, stockpiling, growing locally and innovation are all part of Singapore's toolkit



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At your favourite nasi padang stall, you can choose from beef rendang or fried chicken, vegetables in coconut gravy or sambal eggplant.

Other options could include grilled squid, assam fish or prawn, and egg, tempeh and tofu dishes.

In a country that imports over 90 per cent of its food, these ingredients are sourced from all over – as near as Malaysia and Indonesia to as far as Brazil and South Africa.

Malaysia's ban on chicken exports since Wednesday has cast a spotlight again on food security, especially amid the Russia-Ukraine war and rising global food protectionism.

India has banned the export of wheat, Indonesia the export of palm oil for three weeks, and Argentina the export of some soy products, exacerbating a rise in food prices and global supply disruptions.

Mr Abdul Hadi Kamarulzaman, owner of Istimewa Nasi Padang in Hoy Fatt Road in Bukit Merah, said he has had to deal with rising food costs and supply issues for the past two years. He used to buy ingredients in bulk from a few suppliers but now buys smaller volumes from more sources instead.

Earlier this year, the price of chicken increased over a few weeks from about \$4 per kg to \$6 per kg, "but unfortunately we cannot increase our price to our customers, as they are sensitive to it", he said.

Now he ensures he has at least three suppliers for every food item so that he has backup options.

Ms Mastura Didi, managing director of Hajah Maimunah, a nasi padang chain with five outlets and a catering business, also lamented the increase in prices.

For example, a 17-litre tin of cooking oil that cost about \$30 earlier this year is now \$46.

To ensure a sufficient supply of ingredients, the business now keeps extra stocks at its warehouse, which it procured in March to store its new line of frozen cooked food, and also stockpiles items such as seafood. With the current disruption in chicken supply, the chain has been looking for alternatives, such as frozen drumsticks, which it does not usually use.

"We just have to *tahan* (endure) for now," Ms Mastura said.

While Mr Hadi and Ms Mastura believe their issues are temporary, they are concerned about the uncertain road ahead.

Singapore pursues three key strategies in ensuring a safe and reliable supply of food – it has diverse import sources, and it grows both locally and overseas, through Singapore firms that set up or invest in farms overseas and export the produce back.

These strategies have been developed with the experience of the past, when Singapore had to deal with halts in the import of certain food items or global events causing sharp hikes in food prices.

Statistics released by the Singapore Food Agency (SFA) in April show the Republic's main source of chicken is from Brazil, with 48 per cent imported from there last year. Another 34 per cent was imported from Malaysia, 8 per cent from the United States, and the rest from other countries.

These numbers are similar to those of 2019: 46 per cent from Brazil, 37 per cent from Malaysia and 13 per cent from the US.

Going back two decades, a report by the Agri-Food and Veterinary Authority (AVA) in 2000 showed Malaysia as a major source of poultry, while the major sources of poultry meat were Brazil, the US, China, Thailand and the Netherlands.

Meanwhile, there has been an

increasing reliance on eggs produced locally over the past three years. In 2019, Singapore produced 26 per cent of its eggs, and this rose to 30 per cent last year, as the country continued being the second-largest contributor of egg for consumption here.

The dependence on Malaysia for eggs declined from 72 per cent in 2019 to 52 per cent last year. At the same time, SFA has diversified its sources of eggs, from nine in 2019 to 13 last year.

On its website, SFA says its mission is to "ensure and secure a supply of safe food for Singapore". It took over food-related matters handled by the AVA, the National Environment Agency and the Health Sciences Authority in April 2019.

LESSONS FROM THE PAST

In terms of diversity, Singapore imported from 180 countries and regions last year, up from 172 in 2019, as SFA continues to look for more safe sources.

In 2019, the Government announced a 30 by 30 goal – meeting 30 per cent of the country's nutritional needs locally by 2030, up from less than 10 per cent now.

It has also supported companies venturing overseas, such as Barman Asia in Australia and Brunei and Sky Greens in Thailand and China.

An SFA spokesman noted that when floods disrupted vegetable supplies from Malaysia last year, the food industry was able to pivot to other sources such as China, Indonesia and Vietnam.

Such diversification reduces the potential for crises in food supplies. For example, Singapore relied heavily on Malaysia for pork after local pig farms were phased out in the early 1980s. But a Nipah virus outbreak in 1998 affecting thousands of pigs in Malaysia led to Singapore banning all imports of fresh pigs from its neighbour.

"The Government then had to come up with a creative solution that was acceptable by consumers – that's when they decided to educate Singaporeans that frozen pork is good and you can 'eat well for less'. It is as nutritious, but you pay less as it is frozen," said veteran AVA official Goh Shih Yong, who retired as its spokesman in 2010.

But frozen pork consumption increased only at restaurants, as households still preferred fresh pork, he said.

The Government then flew in chilled pork mainly from Australia, and helped wet market butchers set up refrigerators at their stalls to handle the chilled items.

These efforts have paid off – SFA statistics show 67 per cent of imported pork in 2020 was frozen while the rest was fresh.

When avian flu hit Malaysia in the mid-2000s, Singapore worked with its neighbour to approve farms clear of bird flu to continue exporting here, said Mr Goh.

But the current ban on Malaysian chicken will be a greater test as to whether people have fully embraced the alternatives.

"Luckily after some time, consumers in general have accepted that frozen meat is as good as chilled or fresh meat. I have eaten frozen chicken for so many years that I cannot taste the difference," said Mr Goh, noting that almost 70 per cent of imported chicken here is frozen.

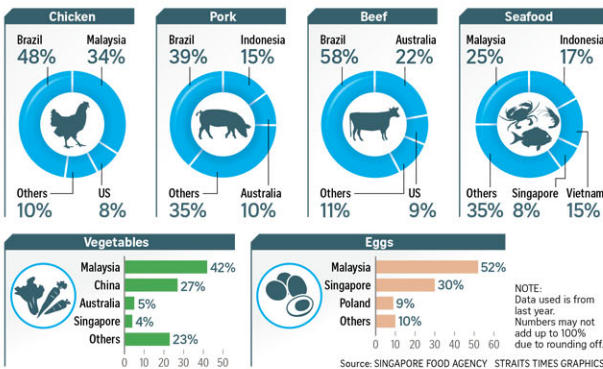
He added that Singapore has also in the past attempted to promote liquid eggs and egg powder as an alternative to fresh eggs, though such use is mostly still in commercial kitchens.

Another major incident that af-



A worker handling a chicken at a poultry processing hub in Singapore last month. Malaysia's ban on chicken exports from June 1 has cast a spotlight again on food security. ST PHOTO: CHONG JUN LIANG

Where Singapore's food supply comes from



fected Singapore's food supply was the 2007 to 2008 global food price crisis, said Professor Zhou Weibiao, head of the food science and technology department at the National University of Singapore.

An increase in rice prices, as Vietnam and India both stopped exporting rice due to shortages and rising prices at home, led to other price rises for basic food items which reverberated around the world.

Thankfully, Thailand, the world's largest exporter of rice then, did not announce a halt on exports, said Prof Zhou. But the global economy still felt the effects of two major exporters choosing to protect their country's needs first.

"It made a country like Singapore think about what happens during a global food crisis, where would we get our food, what happens if no one will export to us?"

Dr Kalpana Bhaskaran, head of the Centre for Applied Nutrition Services at Temasek Polytechnic's Glycemic Index Research Unit, said the Government did step in to reassure the public at the time that there was ample supply of rice and

also provided help to lower-income families.

But it was a reactive approach rather than proactive, she said.

"We securitised water decades ago but didn't pay much attention to food. Maybe we took food supplies for granted as we never expected such a crisis."

While Singapore has ranked highly on the Global Food Security Index – topping it in 2018 and 2019 and ranking 15th last year, it is because the index puts heavy weighting on availability and affordability, which Singapore does very well in, and quality and hygiene, where Singapore does relatively well.

"But we are more exposed and vulnerable during crisis times, which the index doesn't measure. It only shows that we are good in peace time," said Prof Zhou.

WHAT LIES AHEAD

Events from the last few months indicate the possibility of a global food crisis, said Prof Zhou. Apart from Malaysia's ban on chicken exports, there have been the bans on wheat from India and palm oil from Indonesia.

This can cause panic buying – not just by individuals but also by countries, such as during the 2007-2008 global food crisis, when panic buying by some countries in the region caused fluctuations in the market.

"We need to cope with this by continuing to have more steady, reliable sources of supply," said Prof Zhou.

This includes having strategies like stockpiling – for example, the Government requires all rice importers to stockpile at least two months worth of rice – and the ability to import from many countries,

which will act as a "shock absorber", he added. These strategies are already in place but can continue to be bolstered.

SFA is also very careful with its import sources, said Prof Zhou, who was an AVA board member from 2008 to 2015. It considers and inspects not just the country, but also the particular supplier and factory to ensure it meets Singapore's high standards.

Professor William Chen, director of the food science and technology programme at Nanyang Technological University, noted that export bans are short-term solutions that cannot last indefinitely.

"It is a zero-sum game as it will not help the exporter country. Eventually, it will bite them back because the global food system is so interconnected – prices will increase all around and will also affect them," he said.

No country is in a position to produce all the food that it needs, because it is just not economically effective. Even large agricultural countries like China and the United States are the biggest food-importing countries."

Food security experts whom The Straits Times spoke to all pointed to the same solution that can mitigate food supply challenges – technology.

Singapore is moving in the right direction by beefing up its own capabilities through technology, said Prof Chen.

Eventually, the Republic can transfer such know-how to other countries to help them overcome food supply disruptions. "This is a win-win situation – we don't just buy food or grow food based on a transactional agreement. This way, we have more human touch and in times of crisis, we can overcome limitations together," he said.

The research and development team in his programme is in discussions with regional crop growers to implement technology to convert their crops to plant-based proteins before exporting.

Some of their technology and research also aims to reintegrate by-products from the local food processing system back into food production, creating a food circular economy, said Prof Chen.

In one project, the team successfully replaced the egg yolk component in mayonnaise with barley spelt grain – which could help to lessen the reliance on primary production of egg yolk while also reducing food waste, he said.

Additionally, while Singapore phased out much of its farms prior to 2000, it is gradually bringing farming back – but this time with greater use of technology, and maximising the limited land available.

In the 1960s, Singapore used about 25 per cent of its land for farming, but now only 1 per cent is used. "What we are doing now is not to go back to the old ways of farming – rather, it is to apply technology to drive higher yield and higher nutrition farming practices," said Prof Chen.

Urban farms and vertical farms are now popping up, and the Government has been handing out grants and support to firms in this sector, such as the 30x30 Express grant, which provides \$30 million of funding support for the local agri-food industry to ramp up local production in eggs, leafy vegetables and fish.

A fourth egg farm is being built, and when completed in 2026, it will ensure half the eggs needed here are produced locally.

As at last year, Singapore produced 30 per cent of local eggs consumed, 4 per cent of leafy vegetables

and 8 per cent of seafood.

Associate Professor Matthew Tan, co-chair for sustainable development in the agriculture and fishery sectors for the Asia-Pacific Economic Cooperation's Policy Partnership on Food Security, noted that Singapore agencies have been helping farmers not just to automate to raise productivity, but also to mitigate and understand global warming, environmental degradation and carbon neutrality.

Even as farmers renew their leases, they are encouraged to adopt technology, he said.

For example, previously, when applying for one hectare of land or sea space, a farmer was expected to produce a minimum of 34,000kg of fish a year. Today, there is technology available where a farmer can produce two million kg of fish per hectare, said Prof Tan, who is also chief executive of Danish aquaculture engineering firm Assentoft Aqua Asia.

The world is headed towards a shortage of food – according to research, by the year 2050 the global population will need 70 per cent more of the food it produces now, but with 40 per cent more land that does not exist – and technology is key to solving that.

At the same time, however, while local companies adopt technology, costs remain high.

For example, vegetables grown in a vertical farm here cost about \$8 to \$10 per kg, while those grown in neighbouring countries using traditional farming methods go for less than \$2, and the Government needs to help local farmers to bridge this gap in price, whether through temporary financial support or technology, said Prof Tan.

Vertical and urban farming for fish and vegetables is set to become a sunrise industry, while in



The ingredients in a nasi padang meal in Singapore are sourced from around the world. Singapore pursues three key strategies in ensuring a safe and reliable supply of food – it has diverse import sources, and it grows both locally and overseas, through firms that set up or invest in farms overseas and export the produce back. ST PHOTO: KUA CHEE SIONG

the next 10 to 20 years, traditional agricultural farming may become a sunset industry, he said.

Prof Tan said countries have to work in tandem to share technology and best practices. Each country has its strengths, be they in manpower, technology or land space, so "together we integrate and work in partnership so that food security is not just exclusive to Singapore – it is an objective that everyone and every nation is a part of."

EDUCATING THE CONSUMER

Apart from technology, Singapore needs to continue educating the consumer, said food security experts.

Even as the country boosts its agri-food sector, it is also looking into alternatives such as plant-based proteins or cultured meat.

Singapore was the first country in the world to approve cultivated chicken meat, which was commercially available in December 2020.

"Looking at the strategies to cope with a food crisis, each one has its merit but no single one will

work by itself," said Prof Zhou.

For example, even if cultivated meat is available but consumers have difficulty accepting it, then it will not solve the problem by itself.

Even with frozen chicken, if consumers say they still prefer fresh chicken, there needs to be continued public education in tandem with research into freezing technology that can keep the quality high, said Prof Zhou.

A mindset change is key – those who still insist on fresh chicken must be prepared to pay a premium, while others will have to adjust to frozen meat, said Prof Tan.

"I know of a mother who insists on fresh fish fillets for her baby's porridge and I can appreciate that she wants to give the child what she thinks is the best. But when there is a shortage, that's when we will have to change our mindsets," he said.

The SFA spokesman said that while the Government and the industry do what they can to mitigate disruptions, consumers must be prepared for uncertainties and adopt appropriate preventive and mitigating measures.

"Our preferred food may not always be available," he said.

Prof Zhou added that while Singaporeans have been known to be "kiasu", being prepared for crises is a good strategy.

"Everyone should have a certain amount of food at home, that can be kept for a couple of months to a year or more in normal temperature here, so that people can ride through any food supply interruption period," he said, though he cautioned against panic buying and hoarding.

The SFA spokesman added that consumers are encouraged to continue supporting local produce, which will spur local farmers to embrace technology to be more productive to meet increased demand.

Consumers can look out for the bright red SG Fresh Produce logo or items with Singapore as the country of origin when they shop for groceries, he said.

Prof Chen added that consumers now are also looking for healthier and more nutritious food, and younger adults are also conscious about environmental sustainability and pushing for more plant-based protein.

He also said that tackling the issue of food waste is key, so that the world does not have to keep ramping up its food production.

He suggested that restaurant menus indicate the daily calories needed for the average consumer, and include the average calorie value of each dish, so that people do not overeat or over-order.

Dr Kalpana said eating habits have to change to reduce the problem of food waste, but social norms often take time to adjust.

She added: "Singaporeans need to switch from fresh produce to frozen items, use partially prepared items like frozen dough and pre-mixes."

"Consumers may also have to be prepared to pay more for local produce that is fresher and safer, which not only supports local producers but also helps to reduce the food wastage that occurs during importing and reduces overall carbon footprint."

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