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Upcoming NUS centre set to be heart of food research in Singapore

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A new building at the National University of Singapore (NUS) could be the future heart of food research to find innovative ways of feeding the Republic sustainably, The Straits Times has learnt.

The building, which will likely be ready by 2026, will focus on innovation in agriculture, aquaculture and food science, and will provide opportunities for researchers to translate their research to real-world applications.

There will also be a strong focus on research in waste reduction to promote resource circularity at the centre.

Professor Thorsten Wohland, director of research governance and enablement at NUS, said: "Given the synergies between the different research fields, co-locating them in the same building could allow agricultural waste, for instance, to be repurposed for use in the aquaculture and vice versa."

For example, fish offal could be converted to fertiliser, while plant materials not used for food production could become fish feed.

The building will also be home to the Singapore Food Agency's (SFA) Seed Innovation Hub, which will determine, through breeding and screening, the type of seeds most suitable for urban farming which are resistant to disease and drought.

The new NUS centre will "look at the whole cycle of food production – from the selection of plant and aquaculture species, to their growth, processing, and storage, while taking into consideration food safety and consumer product development," Prof Wohland said.

To ensure that the research work is suitable for Singapore's urban environment, researchers will consider new engineering approaches that allow efficient growing, harvesting, preparation and storage of produce.

There will also be more opportunities to collaborate with industry players through NUS Enterprise, the university's start-up arm, said Prof Wohland.

Associate Professor Christoph Winkler from NUS' Department of Biological Sciences, who is overseeing the aquaculture segment of the new centre, told ST that the research in this field will complement current efforts at NUS' Tropical Marine Science Institute (TMSI) on St John's Island.

TMSI has direct access to various aquaculture species and infrastructure at SFA's Marine Aquaculture Centre, allowing researchers to look at farming at scale and to focus on the interactions between the fish farms and the surrounding marine environment.

Aquaculture research at the new centre will zero in on fish species at the cell and molecular level, such as fish genetics.

"Being close to institutes offering highly advanced scientific technology in areas like genomics, engineering and artificial intelligence, we will be able to use state-of-the-art science to understand the basis of diseases at aquaculture farms and develop strategies to overcome them," said Prof Winkler.

Besides pathogens, other factors also contribute to the occurrence and severity of diseases, such as genetics, stress and nutrition, Prof Winkler added. So a large part of the research will look into boosting the immunity of fish – for example, through a deeper understanding of their microbiome – to make them more resilient to stress and disease.

The high mortality rates of juvenile fish at fish farms in Singapore is another pertinent issue that the new centre will seek to address, Prof Winkler added.

The Research Centre on Sustainable Urban Farming (Surf) will have some of its work housed in the new building, where it will conduct research in areas such as selective plant breeding and seeds.

Professor Veera Sekaran, who is head of the Regenerative Agritech Centre, said that Surf aims to bring about better harvest and yield, as well as more nutritional food for the future, especially amid climate-stressed conditions.

Being located at the new building – which is close to the Temasek Life Science Laboratory and NUS Enterprise – would allow for the expansion of the centre's research and greater collaboration with industry players, he added. The work done by Surf is currently distributed across several locations.

Food science and technology will also get a boost when the new building is up, particularly for the trial of advanced food processing technologies, said Professor Zhou Weibiao, who is the Cheng Tsang Man chair professor in food science and technology at NUS.

An example of these technologies is cold plasma processing. It uses electrically charged gases to inactivate pathogens on fresh produce like meat, poultry, fruit and vegetables, thus improving food safety and extending the shelf life of these items, said Prof Zhou, who will oversee this research segment.

Facilities are being planned for the new centre that will allow for pilot-scale processing, such as for the production of alternative proteins, with fermentation tanks available for microbial fermentation, he noted.

"These facilities will allow companies to conduct trials and produce a small amount of products to test the market," Prof Zhou added.

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