

## **The APRU–New York Times**

### **Asia-Pacific Case Competition 2017**

#### **The Future of the Pacific Ocean**

##### **Sowing Seeds of Change in the Pacific Caldron**

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Singapore's food security is intrinsically tied to the future of the Pacific Ocean, as the nation's heavy dependence on imported food leaves it vulnerable to climate-induced disruptions in the Asia-Pacific food supply chain. Shifting demand and production capacity towards locally-sourced food can help Singapore secure its food supply and prompt a regional shift towards more sustainable food systems in Southeast Asia. Given Singapore's strict land constraints, however, industrial animal agriculture cannot scale to match demand here. Plant-based agricultural technologies, by contrast, can be quickly deployed to provide nourishment scalably and cost-efficiently on the island, supported by existing land-efficient seafood production. We therefore propose a major rethinking of the country's food system through shifting consumption towards local sources, boosting production by investing in agricultural technology and education, and exporting these innovations to strengthen regional food resilience. Such a transition would have significant benefits for both Pacific ecosystems and the climate.

An [imperilled Pacific ocean](#) poses an existential threat to import-dependent Singapore, where [95%](#) of food is imported, while Singapore's own food system remains predicated upon unsustainable agricultural practices that endanger ecosystems in the Pacific. Singapore's limited local production is already threatened by climate change; recent warming events and plankton blooms have caused [over 500 tons of losses](#) in its coastal fish farms. Similarly, its suppliers in Southeast Asia are threatened by temperature and rainfall changes projected to cause food price increases of up to [84%](#) by 2050. More globally, animal agriculture is both a [major emitter](#) of greenhouse gases and cause of [dead zones](#) in the ocean, while ecologically degrading trawling to meet fast-growing demand for fish continues to [devastate global fisheries](#). Singapore therefore will confront the effects of an unstable global food system increasingly vulnerable to shocks in the climate and the Pacific. To respond, Singapore must steer its food system towards increased security in the face of climate change while also drastically reducing its ecological impact on the climate and Pacific.



*Fish farms in Singapore are increasingly threatened by climate change.*

The Singaporean government identifies climate-related food vulnerability as a pressing threat to national security, but has failed to create a self-sustaining and resilient food production system capable of withstanding shocks in the Pacific supply chain. The most immediate policy limitations concern the entrenched export-dependence caused by a [lack of secure long-term land leases](#) for farmers, which discourages future investment. Land allocation and resources for agriculture also remain [disproportionately](#) geared towards ornamental flowers and aquarium fish, which are lucrative but useless for providing basic nutritional necessities if Singapore's imports are threatened by climate change. Long-term capacity building is similarly insufficient, with strict labour regulations depriving farms of much-needed workers and dearth of agricultural education programs.

First, we recommend two short term policy options. Singapore must begin by increasing its agricultural leasing periods from ten to thirty years in order to give farmers a strong foundation for future investment. Given the labour intensity of farming and its importance for national security, Singapore must also double its foreign worker quota within the sector from one to two foreigners for every local.

In the medium term, Singapore must reform its land use policy. Production of ornamental fish and horticulture currently occupies 63% of Singapore's agrotechnology park land, and should be entirely replaced with more crops like soybeans, lentils, and vegetables by 2030. Furthermore, the government should steer production away from land-inefficient animal

agriculture towards plant-based foods, which are more land efficient and have a far lower impact on ocean ecosystems. To produce these less profitable but more nutritious and essential crops, farmers should be incentivized through subsidies.

Next, medium term investment in R&D will be critical to mitigate damage to Pacific ecosystems and adapt to forecasted shocks to fish and crop suppliers. Land-efficient recirculating aquaculture systems pioneered by local innovators like [Onhand Agrarian](#) and low-carbon hydraulic farming techniques developed by [Sky Greens](#) have demonstrated increased yields of seafood and vegetables. As a regional hub for biotechnological research, Singapore is well-positioned to bolster food security in the [Pacific caldron](#) by exporting such proprietary technologies to Southeast Asia.



*Sky Greens utilizes a vertical hydraulic rotation system to ensure all crops receive adequate sunlight, drastically increasing yields per unit of land area.*

In the long term, Singapore must lead regional capacity building and enter Southeast Asia's food value chain. By investing in food processing, storage and climate-resilient production through tax incentives and public index funds, Singapore can finance a regional transition away from ecologically degrading agriculture. Additionally, the Ministry of Education must mandate a national curriculum that includes food sustainability and supplement this with exchange programs for students and farmers to transplant innovative practices from abroad and start farms locally.

Ultimately, we believe these measures will establish Singapore as a hub for agricultural innovation and enable it to lead ASEAN in a transition towards sustainable food systems. Recognizing the interdependence between the Pacific, climate, and food systems will equip Singapore to enact the ambitious measures necessary to secure its food supply in an increasingly volatile Pacific future.