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Food Security and the Commons in ASEAN: the role of Singapore

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ABSTRACT: Since the conception of the ASEAN Integrated Food Security (AIFS) Framework in 2008, ASEAN member states have taken steps to implement the components and strategic thrusts laid out in the AIFS Framework. These actions can be seen as contributing to the development of a regional "commons" which is based on prioritizing the right of "all people, at all times, [to] have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996). Although a wide range of conditions exist with regard to this right across the ASEAN member states, as a net-food importing country which imports 90% of its food from a limited number of sources, in this paper Singapore is presented as a case study for the increasing importance of taking a commons perspective on food supply and security. The paper is particularly concerned with actions to diversify food sources, increase local food production and promote food and agro-based industry, research, and development. In the context of a highly urbanized population with limited land and natural resources, the paper argues that those seeming disadvantages can serve to benefit both the local and wider community.

Initially part of a design research project to discover, document, and test potential strategies to address Hong Kong's situation as a net-food importing territory which relies on a limited number of sources - 95% of its food is imported and 60% of that comes from Mainland China - this paper traces the recent history of food security policies and actions in Singapore with respect to increasing local production. The paper examines several case studies that demonstrate the application of the AIFS framework, in particular the development of research, technology and community resources for urban agricultural production. The paper concludes with a reflection on Singapore's role in providing for a food secure future for itself, and by extension, the entire region.

Introduction
With a population of over five million people inhabiting an area of just 710 km^2, Singapore is one of the most densely populated places on earth. Over half of the area of the country is urbanized, with only 1% of land area officially designated for agriculture, and the balance made up by forest and water catchment reserves, military training and undeveloped areas. Due to this imposed scarcity of land available to produce its own food, Singapore imports over 90% of its food from more than 15 countries around the world, with an increasing percentage sourced from ASEAN member states(AVA 2011). Although Singapore is considered relatively food secure due to its high level of purchasing power and role as a trade and transshipment hub, the country is at risk of food unavailability due to supply disruptions from its international trading partners resulting from a number of global, regional or local scale crises. These crises range from short term emergencies such as disaster events, war or political conflicts, to longer term climate change related issues such as changes in weather patterns resulting in drought or flooding, or the exponential increase in the global population. Each of these factors may lead to countries prioritizing feeding their own population, therefore decreasing total exports.

In this context, the primary focus of ASEAN related policy and government support for food security measures in Singapore is on the diversification of food sources and on pro-business policies to support the development of agribusiness related technologies and international
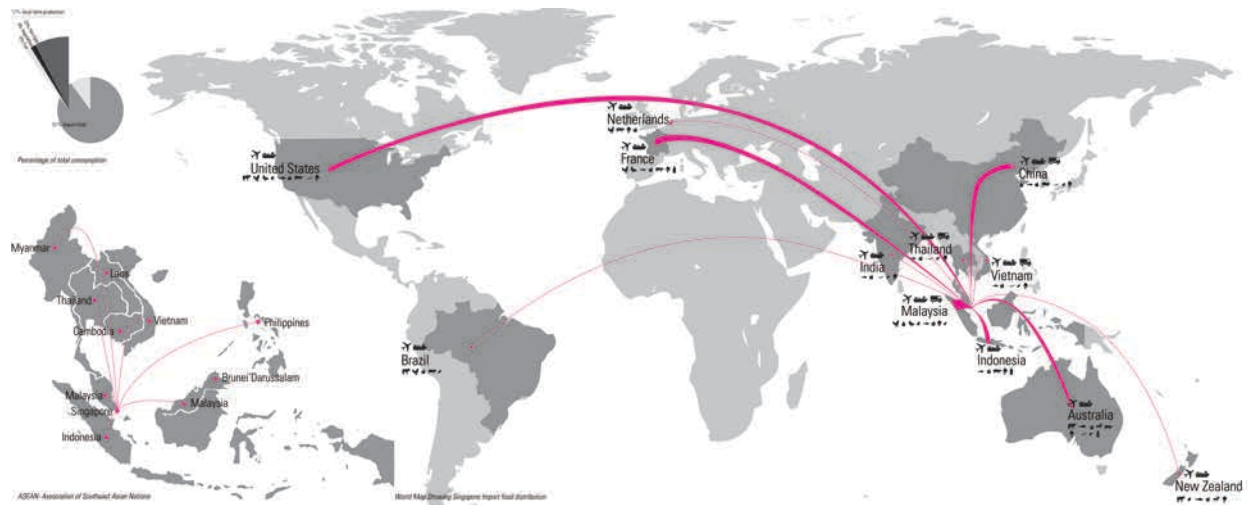
Figure 1: Singapore's local, regional, and international food supply

partnerships. Some ways this this strategy provides protection against future volatility in the market is through the export and enforcement of its stringent food safety standards, risk assessment in source countries with regard to food safety concerns, its high level of advanced technological development, and its continuation of its leading role as a broker of food commodities through its function as a primary port for global transshipment. However, recent Singaporean policy has also set specific targets for the increase of local food production, namely in eggs, fish and leafy vegetables. By investing in other countries, and in ASEAN member states in particular, while also renewing its support of local agricultural development, Singapore aims to increase both it's food resilience and to a smaller extent, it's food self-sufficiency. The primary means of increasing local production is again on supporting measures to intensify food production through technological developments, with a focus on concentrating production in large agrotechnology 'parks', and developing new methods of farming such as hydroponics, aeroponics, and aquaponics.

In contrast to its current focus on food as a traded commodity, in introducing an understanding of food as a common resource and part of the global commons (Viviero Pol 2013), this paper examines Singapore as a case study for the increasing importance and potential futures of taking a commons perspective on food supply and security. The paper is particularly concerned with how actions to increase local food production could be complemented by the increased development of local networks of food supply: public education about the benefits of local food, expanding the role of community gardens and urban agriculture, and increasing public access to local food sources. In the context of a highly urbanized population with limited land and natural resources, the paper examines how those seeming disadvantages can serve to benefit both the local and wider community, especially if a local network of food supply can be developed and promoted which is able to complement the commodity and private enterprise-driven approach which has been the focus of Singapore efforts to this point. By demonstrating how even a highly urbanized population can provide for a larger proportion of its food by adapting existing and new technologies and methods for local and intensive food production and through public education, Singapore can not only provide financial support to the region through trade, but can also be a regional and international model for dense cities' sustainable food self-sufficiency which can be championed by the ordinary citizen/resident through their actions, food and monetary choices.

The ASEAN Integrated Food Security (AIFS) framework
Singapore is one of the founding members of the Association of Southeast Asian Nations, which also includes Indonesia, Malaysia, the Philippines, Thailand, Brunei, Myanmar, Cambodia, Lao PDR, and Vietnam. Its aims include accelerating economic growth, social progress, and cultural development in the region, promoting regional peace and stability, and promoting active collaboration and mutual assistance (Asean.org 1967). In line with the establishment of the ASEAN Economic Community by 2015, a series of regional policies have been implemented to increase security, and sociocultural and economic integration, including free trade agreements within the Association and its primary trading partners (Asean.org 2013) and agreements and other policies that concern environmental and social justice, such as the ASEAN Integrated Food Security framework and the Strategic Plan for Action on Food Security in the ASEAN Region (SPA-FS).

Adopted in 2008 in the context of global food price surges and accompanying food supply disruptions, the AIFS framework lays out a series of components and strategic thrusts to secure the rights of "all people, at all times, [to] have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996). The stated goal of SPA-FS portion of the AIFS framework is to ensure long-term food security and to improve the livelihoods of farmers in the ASEAN region (AIFS Framework 2008, 2).

There are three primary dimensions to ensuring food security: availability of food, physical and economic access to food, and food utilization. Food is available for a household when it is able to acquire enough food of appropriate quality to meet its needs. Food accessibility is when food is within either physical and/or economic reach of a household or individual. The final dimension, food utilization, is when food is able to used to its full nutritional benefit by a household or individual in the context of outside factors such as clean water, sanitation and health care (Teng and Escaler, 2010; AFIS Framework, 2008, 2). These dimensions are usually addressed by national policies that aim towards either food self-sufficiency or food self-reliance. The former focuses on the production of food for domestic consumption and the latter primarily of the availability of food for domestic consumption (Chandra and Lontoh 2010, 1). However, it is not an either/or situation - within ASEAN, each country sits somewhere along the continuum from food self-reliance to food availability, with primary agricultural producers and poorer nations relying more heavily on their own productive capabilities (e.g. Thailand and Vietnam) and more wealthy countries and/or those without a strong agricultural base tending to focus their policy on food self-reliance and assuring access to food through imports rather than assuring its domestic production (e.g. Singapore).

The AIFS framework has four components (C) with six accompanying strategic thrusts (ST) to address the existing and increasing potential for food insecurity within ASEAN Member States (AMSs): C1 - Food Security and Emergency/Shortage Relief / ST1- Strengthen Food Security Arrangements; C2 - Sustainable Food Trade Development / ST2 - Promote Conducive Food Market and Trade; C3 - Integrated Food Security Information System / ST3 - Strengthen Integrated Food Security Information Systems to Effectively Forecast, Plan and Monitor Supplies and Utilization for Basic Food Commodities; and C4 - Agricultural Innovation / ST4 -

Promote Sustainable Food Production, ST5 - Encourage Greater Investment in Food and Agro-based Industry to Enhance Food Security, and ST6 - Identify and Address Emerging Issues Related to Food Security. Each of the strategic thrusts in the SPA-FS is supported by an Action Programme(s), Activity, Responsible Agencies and Work Schedule (AIFS Framework 2008, 4).

In order to implement the AIFS Framework and SPA-FS, three key initiatives have been extracted as central to Singapore's food security policy: 1) the diversification of food sources; 2) the promotion of food and agro-based industry, research, and development; and 3) the increase of local food production (AVA 2011) (AVA 2012). The first action is specified by AIFS/SPA-FS Activity 1.1.1: Promote diversification of food sources and scale up community based food security initiatives and 5.1.2: Strengthen capacity building for adoption of international standards for food safety and quality assurance programs. Action 2 is also specified by multiple Activities, including 5.1.1: Encourage greater investment in food and agro-based industry, 4.3.2: Promote research to improve agricultural productivity and production and 4.4.1: Promote the adoption of new technologies. Singapore's final food security policy initiative is also specified by multiple activities, some of which overlap with the other actions, but which are primarily specified in 4.2.2: Promote public and private sector partnership to promote efficient and sustainable food production, food consumption, post-harvest practices and loss reduction, marketing and trade. Although most of these Activities have a dual function domestically and regionally, how can they be understood in terms of food as a commons?

Food as a commons
Food is a basic human need and a human right. The application of the concept of the commons, where "a common good describes a specific resource that is shared and beneficial for all or most members of a given community" (Viviero Pol 2013, 7) can be traditionally understood in relation to food as based on the common natural resources shared by communities such as the sea, grasslands and forests. Since the advent of agriculture however, food supply resources have increasingly been enclosed, and food is increasingly (if not almost universally) considered a commodity, traded, copyrighted and in the hands of a small number of multinational corporations who control the supply, distribution and retailing of food products. For example, in Singapore, two large corporations own the majority of the supermarkets, hypermarkets, convenience stores and so-called farmer's markets/specialty food retail stores: Dairy Farm (over 400 stores - brands include Giant, Jason's, Cold Storage, Guardian and 7-11) and NTUC Fair Price (over 150 stores - brands include Fair Price Xtra, Finest, Express and Cheers). This duopoly means that not only is the price of food regulated and competitive, but also that there is a lack of choice – each own mega-warehouses which supply all of their own stores. Although the specific contents of stores may vary by their location, all products are controlled and chosen by corporate interests that prioritize profits over nutrition and food for all.

This understanding of food as something which you buy from a store or a restaurant, has led to successive generations lacking a connection to the source of their food – how it is grown, where it is produced and what environmental inputs and outputs as well as labor is required to produce and distribute food, even though it is a fundamental necessity and an ever present part of their daily lives. Of particular concern is whether local actions to educate and raise awareness amongst the public and private sector about their role in producing and sourcing food locally and regionally can succeed in furthering an understanding of food as a commons. Is there potential

for a local, community based network to supplement regional integrated cooperation in order to counter the prevalent commodity-based approach to food supply and distribution, in which food is treated as a private good, available only to those who can afford to pay for it? Can Singapore be a model not just for investment in propriety technology and agribusiness, but also demonstrate its ability to address the human right to food?

In the case studies that follow, four types of local production are presented: 'traditional' agricultural practices in place since the mid-1980's when small subsistence farms were combined into commercial farms located in agrotechnology parks (zones designated for agriculture) in order to increase yield through technological adoption and economies of scale and distribution; formal and informal community gardens; a recent technological innovation to grow leafy produce in high initial capital investment but low operational cost, sustainable, intensive 'stacked' system; and a NUS architectural studio project which applied the principles of these systems to derive a spatial strategy for addressing emergency situations, as well as a "notional food crisis that will be precipitated in 2030" (Ng 2012: 99). These cases provide a portrait of a possible growth of a locally-based network which is based on the notion that food is a common resource which can benefit from community initiatives to provide opportunities for food to be accessible and available to all.

The case of Singapore
As the country with the highest per capita income in ASEAN, Singapore is considered to be relatively food secure (Bello 2005:92), following a model based on food self-reliance. However as the impacts of the global increase in food prices in 2007/2008 and again in 2011 evidenced (Chandra and Lontoh 2010, 3), Singapore is still vulnerable to food unavailability due to its reliance on imported food. Although rice is still the primary staple food in Singaporean diets[1], due to the high income of the majority of Singaporeans and the ethnic diversity of the citizen, resident and non-resident populations of the country, demand has increased for meat products, high quality fresh vegetables and fruits as well as processed goods (Bello 2005: 89). This demand has influenced specific actions to educate the public about food choices so as to prepare for an emergency disruption in supply (such as the benefits of frozen meat and egg powders/substitutes), as well as policies that are intended to support local production of key products such as leafy vegetable, eggs and seafood. Seen as part of the total effort to ensure food security, these efforts to increase local production and consumption, or food self-sufficiency, in Singapore can be understood as a complement to policies to diversify food sources and promote food and agro-based industry, research and development so as to increase the country's food self-reliance. Several authors have made the claim that it is through the commodity-based, research and development component of Singapore's food security strategy that Singapore can play a greater role in the food secure future for the entire region (Kassim 2011; Teng & Escaler 2010). However, due to the tendency of these developments to further enclose resources and knowledge, the potential for a 'commons' approach to food in Singapore and in relationship to other ASEAN nations, is seen in this paper as resting in its efforts to increase local production through a combination of new community networks, spatial strategies for land development, and approaches to educating the public as to the value of locally grown and sourced food, in particular, the food one can grown oneself or buy from local Singaporean producers. It is felt

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[1] Actions to stockpile and control rice pricing and supply are not within the scape of this paper. See Bello 2005 for an analysis of role of staple cereals with regard to ASEAN integration.

that a more nuanced and multi-faceted approach to increasing local production is required, as can be seen through the several case studies below.

Agriculture in Singapore: brief history and current status
With records of inhabitation tracing back to the 2nd century AD, Singapore has a long history as a port of trade as well as a producer of agricultural products, from rubber and gambier to nutmeg, pepper, tropical fruit and orchids. As the population of Singapore grew throughout the 19th and 20th century, agricultural production was pushed out to the city center in the south part of the island to the northern hinterlands (Hee 2005, 53). As recently as the 1960's, Singapore had over 20,000 subsistence-type farms on over 14,000ha of land. In the 1970's many farmers were relocated for water catchment projects and agricultural production was centralized into larger commercial farms where intensive production technologies enabled Singapore to produce of 80% of the poultry, 100% of the eggs and 100% of the pork required to feed the approximately 2.3 million people which resided in Singapore in 1975. The 1980's saw a further reduction in the amount of agricultural land due to the building of housing and industrial estates, with approximately 2000 farms occupying approximately 2000 ha of land. At that time the Primary Production Department (the pre-cursor to the AVA) began the development of agrotechnology parks in order to maximize productivity of farmland, phased out pig farms due to environmental pollution, and increasingly focused efforts on the introduction of high-tech, intensive farming practices and methods. (Ava.gov.sg n.d.; En.wikipedia.org n.d.).

Figure 2: Food networks and nodes of Singapore

As of 2010, there were approximately 1500 ha devoted to agriculture and aquaculture in six agrotechnology parks located in Lim Chu Kang, Murai, Sungei Tengah, Nee Soon, Mandai and

Loyang. However only half of the area of the parks is allocated to approximately 200 farms, and less than a third, covering around 200ha, produce food (primarily vegetables and fruit, fish and poultry/eggs) with the balance given over to the production of aquarium fish, orchids, and ornamental and aquatic plants (Ava.gov.sg n.d.).The high level of vacancy can be seen in the AVA maps of each of the parks, refuting the claim that there is a scarcity of land for agricultural production. It may be true that "the modern farms in the Agrotechnology Parks develop, adapt and showcase advanced technologies and techniques for intensive farming systems, and for export of high value and quality products and services to other tropical countries in the region" (Ava.gov.sg n.d.) but as far endeavoring to meet the policy goal of intensifying local food production, at least on the land officially designated for intensive agricultural production, much more needs to be done to support local farmers and agriculture.
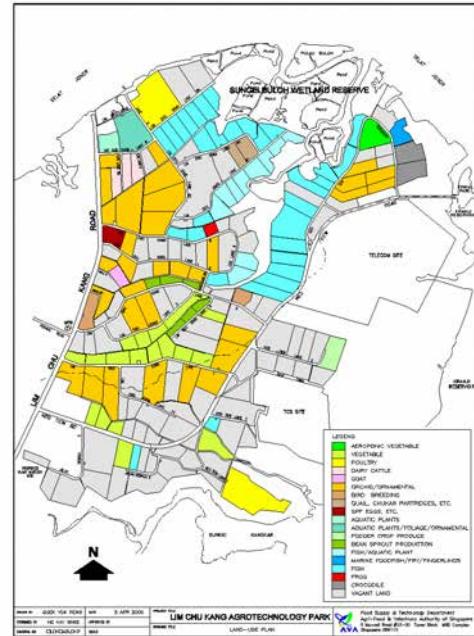

Figure 3: Lim Chu Kang Agrotechnology Park Almost 50% vacancy

Although farms can apply for money from the $10 million AVA-administered Food Fund to improve productivity on existing farms or to develop new technology, local farmers who are part of the Kranji Countryside Association (KCA), one of only a few farmer's organizations in Singapore, cite several hurdles to opening or expanding agricultural operations to produce food. These hurdles include: relatively short-term leases (20 years, with 3 year extensions) which make it difficult to invest in technology, improvements and training; higher prices for ornamental plants and fish for export, leading many farms to turn away from food production; and a lack of awareness on the part of the public as to the benefits of local food, and therefore consumer unwillingness to pay more for local produce rather than produce imported from China or Malaysia (Tobias 2011). These issues need to be addressed in order for a local network of commercial food production to flourish in Singapore.

Figure 4: Argotourism trail: Kranji countryside

There are a few signs that the public is interested in educating themselves about local food production. An agrotourism map and trail have been developed by the KCA in partnership with the government, with several organic and conventional produce farms and fish farms opening their doors for public tours, and several even have weekend farmer's markets where the public can come and pick or buy fresh food from famers, or take workshops on growing food or other agriculture related topics. Also, other markets which also sell cooked food and other goods and services, like the Farmart Center in Sungei Tengah, are local landmarks which provide a 'kampong experience' complete with a petting farm, as well as a gathering spot for the whole family which draws a loyal crowd of tourists as well as local workers who come for the inexpensive food and lively, casual atmosphere. It is here, on the consumption side of the coin, that the Singaporean

government should also look for ideas on how to increase local food production. If food is to ever to be understood as part of the commons in Singapore, the value of a community spirit and support of local industries needs to be developed in order for food to become accessible and available for all, in particular for the 20% of the population who live at or below a social inclusion level of income (Loh 2011, 90). Those who can afford to pay for local food need to be educated about the value of supporting urban agriculture, for health, safety, taste and for the creation of community. And for those that do not have economic or physical access to food, other options are needed so they can produce their own food, such as community gardens. It is only then that Singapore can become more self-sufficient in its food supply.

Figure 5: Formal community garden in Jin Tech Whye (left) and informal community garden in Clementi

Local production - community gardens
Launched in 2005 by National Parks (NParks), the Communities in Bloom program provides logistical support for public and private housing estate residents, schools and other organizations and institutions to develop community gardens. Since the start of the program, over 450 gardens have been developed. Often located in common areas, on vacant land or adjacent to roadsides, the gardens contain both ornamental and productive plants that are maintained by the local community. Harvested are often shared amongst residents or are sometimes sold in local markets. Although NParks works with the Residents' Committee (RC), Neighbourhood Committees (NC), or Residents' Associations (RA) to deliver partial financial support to participants in public and private housing estates, it is usually the residents themselves who finance their gardens and provide the ongoing maintenance of the gardens.

The projects are sold as contributing to the "kampong lifestyle" in housing estates, hearkening back to a time when many residents of the island grew their own food for their families and communities. This spirit is even more evident in so-called illegal or semi-legal farming plots, often established along streams or on slopes by residents who want additional space to grow food or who cannot afford to take part in the official programs. This desire to grow food and the recognition that it doesn't take much space to do it, connects residents to the land, creates a sense of community, and allows those who cannot afford fresh vegetables, fruit and other products like herbs and flowers, to provide for themselves separate from the corporate-driven system of food

commodity trade. The benefits if local produce, particularly if it is organically grown, include lessening the ecological food print of the city - less travel time, less fossil fuels. Another benefit is knowing where your food comes from, how it is grown and who has grown it. This is an invaluable lesson for both children and adults and leads to the support of another food security principle, that of food utilization. The supply of fresher food that has more nutrients and where one is aware of the inputs and outputs of its growing process leads to a safer and more nutritious diet. Although food grown by individuals cannot completely allow Singapore to become food self sufficient, it is these developing networks that hold the potential for food as a commons to take hold in Singapore. Rather than focusing solely on the development if proprietary technological solutions to intensifying, local food production, formal financial support should be given to educating the public about the benefits of producing and buying local food, rather than contributing to people increasingly valuing internationally sourced produce. Although the expansion of community gardens is one solution to increasing local food production, a recent project has combined both technology and intensification: the Sky Greens urban vertical farm.

Figure 6: Sky Greens prototype From left: harvesting, water and tray system, A-frame structure

Innovative prototype development – Sky Greens
A family operation run by the inventor of the system and his wife, the Sky Greens hydraulically powered rotating vegetable flat system was developed by an engineer seeking to create a low cost, sustainably powered, intensive agricultural production system. The system consists of a 6m tall A-frame structure whose 'rungs' of trays of leafy vegetables are planted in a combination of lightweight soil and on-site produced compost. The trays rotate through a pool of fertilizer infused, constantly circulating water located on the ground underneath the A-frame. The plants rotate through the water to the top of the polycarbonate sheet enclosed greenhouse back to the water once every 32 hours so all of the plants get an equal amount of sunlight and water. The prototype installation consists of 120 towers on 3.5 ha and uses 75% less water, fertilizer and soil than the same amount of vegetables grown conventionally in the ground. Each group of 16 towers has its own 6m deep well that is primarily supplied by rainwater and monitored manually for nutrient levels. A 1 horsepower pump that is run on solar power draws water up a pipe from the bottom of each well/tank to power the waterwheels that use a pulley-like system to run the

rotation of the rungs through each A-frame structure. The speed of rotation can be adjusted or stopped, for example when it is time to harvest or transplant, the trays are advanced to waist level do as to create an ergonomic and accessible experience for the greenhouse worker. This innovative system is promoted as being capable of being implemented in a wide variety of environments and contexts, such as rooftops or in vacant spaces.

Funded partially by the AVAs Food Fund, this case is lauded as an exemplary model for technological innovation in support of the SPA-FS activities to promote research to improve agricultural productivity and production, but the proprietary nature of the system and the high initial capital investment required limits the applicability and reach both within Singapore and in ASEAN members states, instead appealing to wealthy countries or those with established high capital greenhouse projects already underway. This highly innovative and simple system then becomes just another piece of proprietary knowledge rather than a step to a more equitable approach to food as a commons. However if its stacked nature and basic principles could be considered part of the creative common of knowledge, the project can be seen as part of Singapore's overall strategy for food security while also taking part in the development of a regional commons with respect to food production and technology transfer. The final case study below makes just that assumption.

Education, outreach and scenario planning - Food sovereignty studio at NUS
Explicitly a strategy for food sovereignty rather than food security, the design research projects of Associate Professor Ng Wai Keen students at NUS explored a scenario planning based approach which looked at the short and long term risks to Singapore's urban resilience with regard to food supply in the face of potential lack of imports due to factors such as climate change, political unrest, and natural disaster in source countries. The student research is based on two assumptions that then identified two scenarios and three 'strands' with which to address those scenarios. The first scenario, in which strategies are developed to provide food for emergency situations, is based on the assumption that "it is neither realistic nor is it economically and environmentally viable to attempt to meet Singapore's entire food needs through in-country cultivation" (Ng 2012, 99). The second scenario is based on the assumption of the coming "notional food crisis that will be precipitated in the year 2030" (Ng 2012, 99). The studio looked at the pattern of food needs and supplies in Singapore, and identified three primary directions (or 'strands', as they are termed by Ng Wai Keen) for their research and policy proposals. The first 'strand' appropriates the potential for intensive vegetable and poultry/egg production through stacking farming layouts (as demonstrated by the Sky Greens prototype) in which production is increased six times over traditional ground-based agriculture. The second looks at expanding fish production capacity through an increase in productivity and through the devotion of greater areas to offshore fish farming, potentially through collaborative enterprises with Indonesia. The third strand looks at 'productive landscapes' where areas that are currently underused or single purpose are converted to vegetable or replacement carbohydrate production. In the end, the student projects proposed a variety of temporary solutions to provide a 3 week supply of food after a 4-6 week preparation period which are primarily founded in the adaptive reuse of schools, parking garages and open spaces which could be temporarily transformed when the need arises, but then could be returned to their 'normal' function after the crisis, or alternately, kept in production as a long term strategy to increase food security for the country.

What was most interesting about the studio work in relation to Singapore's potential to take a commons based approach to food security, beyond its prescient focus on scenario planning as a way to envision the future increase of local food production in Singapore, was the testing of the strategies on Bedok, a new town in the southern district of Singapore. By zooming in to a specific area, the research tests the approach by beginning to identify parcels of open space, rooftops or other types of vacant or underused land in which a community network of urban agriculture could be expanded. Countering the myth that Singapore has a scarcity of lane for agriculture, the studio research showed that it is possible to change the definition of agriculture in Singapore from one which is primary focused on commercial production of food in specially zoned areas which are far from the majority of the population, to one where food can be grown by the local population in their communal or individual backyards for their own consumption. This model of urban agriculture, whereby food and agricultural knowledge becomes a shared resource and an opportunity to connect residents back to the land, results in an increasing appreciation of the benefits of locally produced food and a decreasing reliance on imports to ensure that food self-sufficiency forms a greater part of Singapore's food security strategy.

Summary – food security and the commons
If food is considered both a human need and a human right, then the role of the commons in relation to providing food sustainably and equitably in the region must be pursued as an alternative to the understanding of food as a commodity. Although Singapore has a suite of strategies to support the implementation of the policies of the AIFS framework with regard to the diversification of food sources and the promotion of food and agro-based industry, research, and development, there is more that it can do to increase local production. With its focus on the private sector and agro-business, Singapore misses an opportunity to take a commons approach to food security. More logistical and financial support is needed: for consumer education about the benefit of local food production; for local farmers and community gardeners to expand their operations; and for technological innovators to share their information and knowledge, rather than creating proprietary systems. These local actions can then lead to a community network of food supply that can serve as a regional and international model for food self-sufficiency that can complement the current focus on corporate-sector developments and innovations. Much in the same way that New York or London is embracing and supporting local food production through community action, Singapore can also be a leader in sustainable food security policies and programs by recognizing the importance of taking a commons based approach to increase local food production.

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