

Cheat Sheet

FOOD SUPPLY: Alternative Sources



INTRODUCTION

As we often hear in the news, the world's scarce resources are going to get even scarcer and more expensive due to global demands for vital resources, such as energy, water and food.



The problem is complex as overcoming one resource's scarcity may cause shortages in other resources. Farming may cause water pollution, food and biofuel crops can compete for the same scarce land, and energy must be spent to turn seawater into clean potable water.

By United Nations estimates, the world will need a third more water, 45 percent more energy, and 50 per cent more food by 2030¹.

BY
2030

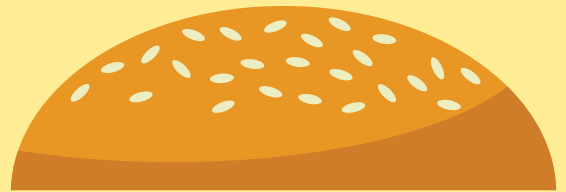
45%
MORE
ENERGY



1/3
MORE
WATER
50%
MORE
FOOD



FACTORS CONTRIBUTING TO FOOD SCARCITY INCLUDE:



**GLOBAL
POPULATION
GROWTH**



**INCREASING
USE OF
CROPS FOR
FUEL RATHER
THAN FOOD**



**DIMINISHING
FARMING
LAND DUE TO
URBANISATION
AND CLIMATE
CHANGE**



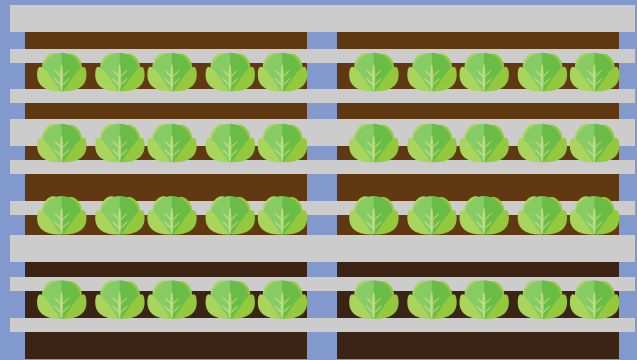
**MARKET
SPECULATION²**

Harnessing Technology to Increase Food Production

THE FOLLOWING ARE SOME STRATEGIES TO HARNESS TECHNOLOGY FOR FOOD PRODUCTION:

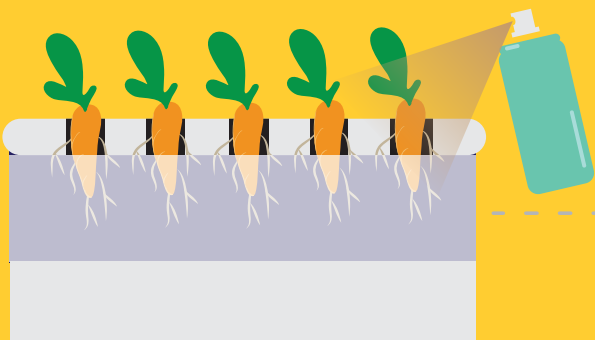
VERTICAL FARMING

- High-tech farm houses in urban areas.
- Crops are grown in stacks using artificial lighting and climate control, usually with no soil or sunlight.
- Uses minimal land, water, and other resources³.



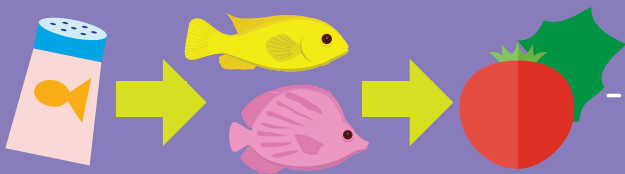
AEROPONICS

- No growing medium is used, with roots of plants suspended or hung in a dark chamber and periodically sprayed with nutrient-rich solution⁴.
- Produces cleaner vegetables as they are cultivated under protected environment.
- Saves water and land, especially in Singapore's context.



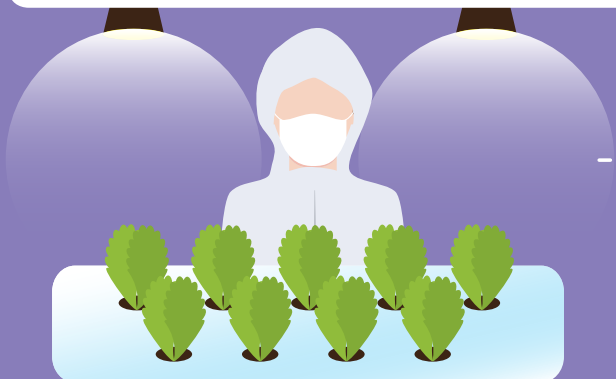
AQUAPONICS

- Hybrid food growing technology that combines aquaculture (growing fish) and hydroponics.
- Sustainable and intensive food production system which can produce two agricultural products (fish and vegetables) from one nitrogen source (fish food).
- Efficient use of water, and does not require soil, fertilizers or chemical pesticides⁵.



GENETICALLY MODIFIED (GM) FOODS

- Foods derived from organisms whose genetic material (DNA) has been modified to improve yield.
- GM crops have increased resistance to plant diseases or increased tolerance of herbicides.
- Greater food output at lower cost for consumers⁶.



CLEAN ROOM FARMING

- Technology company Toshiba had converted a 21,000 square foot electronics factory into an organic farm known as Toshiba Clean Room Farm Yokosuka.
- Crops are grown in a completely isolated and germ-free environment, with nutrients and vitamins injected directly into the plants' roots⁷.
- Uses artificial light, temperature and humidity controls, with the farm patrolled by workers in body suits and face masks fertilizers or chemical pesticides⁷.

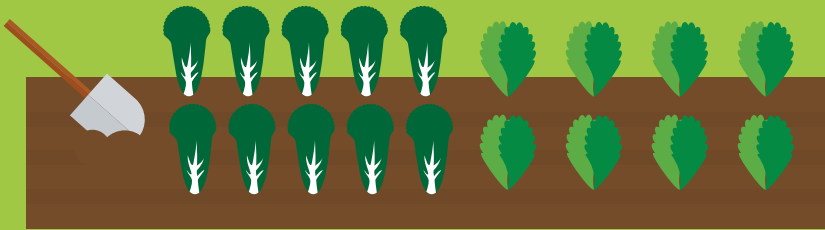


Community Gardening: Local Community-based Efforts in Food Supply

Community gardens are common spaces where people of different demographics come together to create, develop and sustain a gardening space in their locality. Through community gardening, a gardening culture and a greater sense of civic ownership is manifested amongst the public and private estates, schools and organisations involved in these projects.



Low-income communities may use community gardening to supplement their families' diet and income. Other community gardens grow food to donate to local charities. Some schools also use community gardens to educate students on ecology and nutrition⁸.



How to start a community garden in Singapore?

Launched in May 2005, and first carried out at Mayfair Park Estate, the nationwide Community in Bloom gardening movement aims to foster a community spirit and bring together residents, both young and old, to make Singapore our garden. NParks has provided guides on how to start a community garden on its website⁹.

Community Benefits

Provides green spaces, which enhance the quality of life enjoyed by urban residents, an avenue for physical activity and a place for social interaction, all of which promote healthy lifestyles.



Economic Benefits

Increases access to nutritional foods in low-income communities and acts as a supplement to many families' food budgets.



Health Benefits

Offers access to fresh and nutritious foods at a relatively cheap price. Can also act as a nutrition education classroom, with additional benefits of planting and tending to a garden providing an outlet for physical activity⁸.



World's First

A genetically modified (GM) salmon created in 1992 by Emeritus Professor Hew Choy Leong from the department of biological sciences at the National University of Singapore has been approved for consumption by the United States Food and Drug Administration (FDA) on 20 November 2015, after 20 years. This GM salmon, modified to carry a growth hormone gene from the Pacific chinook salmon and DNA from the eel-like ocean pout, can grow faster as the hormone is kept active all the time¹⁰. As this is the world's first genetically engineered animal approved for consumption and consumer reaction has not been documented, please check the latest news updates on this from time to time.



Did you know?

A 9m-tall system with tiers of planting troughs which rotate around an aluminium frame, invented by a vertical farm company in Singapore, Sky Urban Solutions, won the biennial **INDEX: Award** in Denmark in 2015. It can grow 10 times as many vegetables as traditional farming methods over the same area¹¹.



Did you know?

The Urban Agriculture Network - Western Pacific presented Singapore's AeroGreen Technology Pte Ltd., with its annual Urban Agriculture Award in 2000, for its innovation in aeroponics¹².



Did you know?

Four Iowa men in their 20s were tasked to turn a plot of land into the city's new landmark in 2014. The four friends, Kelly Norris, Tyler Johnson, Josh Schultes and Winston Beck, had started gardening together in the horticulture club at Iowa State University. From these initial forays into gardening, they eventually caught the attention of the **Greater Des Moines Botanical Garden**, which hired them to develop their conservatory into a 5.7 ha civic project, with US\$12 million pumped in from the city's establishment for the garden's new master-site plan¹³.



Search Tips

Many so-called facts or news on food supply circulating on the internet may appear to be current and 'real'. Instead of believing wholesale that everything is real, have you ever stopped to ponder whether the information you are reading is a fact or myth before using or forwarding it?

Examples are:



An email containing a warning against eating locally farmed fish was circulated after mass fish deaths had occurred. The Agri-Food & Veterinary Authority of Singapore (AVA) later declared that the warnings were a hoax¹⁴.

Similarly, there was a warning against eating imported apples in Singapore after a neighbouring country had banned some of its imports that were contaminated with bacteria. The Agri-Food & Veterinary Authority of Singapore (AVA) later declared that Singapore did not import the affected batches of apples, and that our imported apples are safe for consumption¹⁵.



Always check your facts! Not everything you read online can be trusted. For a quick fact check, watch the video "The Case of the antique chairs" from this website¹⁶:
<http://www.nlb.gov.sg/sure/video-case-of-the-antique-chairs/>

Overview of the 5-Finger Test :

Authority

Writer / Organisation

1. What is the author's academic qualification?
2. Where did he obtain his / her education from?
3. Has he / she written / published any other publications?



Accuracy

Factual Information

1. How accurate are the facts? Do they support the facts from other sources of information?
2. Are the data based on credible research findings?
3. How can I separate the information presented according to opinion, personal experience and facts?



Coverage

Research Scope

1. Who is the target audience of this information?
2. What is the research scope? Is the information provided in-depth?



Objectivity

Purpose And Intention

1. What are the author's possible intentions and purposes?
2. Why did the author write this way?



Currency

Date

1. What is the date of the post or publication?
2. Which particular period is the author focusing on?
3. How often is the information updated?



The information in this cheat sheet is accurate at the time of production.
This cheat sheet is intended for educational purposes only.

References:

1. Chua, G. (2013, March 25). Tackling food, water and energy crunch. *The Straits Times*.
2. *Global food supply is a growing problem* (2008, June 8). Retrieved November 2, 2015, from Telegraph: <http://www.telegraph.co.uk/finance/economics/2791256/Global-food-supply-is-a-growing-problem.html>
3. Brennan, M., & Gralnick, J. (2015, June 24). *Vertical farming: The next big thing for food—and tech*. Retrieved October 29, 2015, from <http://www.cnbc.com/2015/06/24/vertical-farming-the-next-big-thing-for-food-and-tech.html>
4. Phipps, N. (2015). *Growing with aeroponics: Learn about aeroponic gardening*. Retrieved October 29, 2015, from <http://www.gardeningknowhow.com/special/containers/growing-with-aeroponics-what-is-aeroponics.htm>
5. Somerville, C. et al. (2014). *Small-scale aquaponic food production: Integrated fish and plant farming*. Retrieved October 29, 2015, from <http://www.fao.org/3/a-i4021e.pdf>
6. *Frequently asked questions on genetically modified foods*. Retrieved October 29, 2015, from http://www.who.int/foodsafety/areas_work/food-technology/faq-genetically-modified-food/en/
7. *Toshiba factory farm grows lettuce without soil, sun or pesticides* (2014, November 17). Retrieved October 29, 2015, from Planet Experts: <http://www.planetexperts.com/toshiba-factory-farm-grows-lettuce-without-soil-sun-pesticides/>
8. Hallberg, B. (2009). *Using community gardens to augment food security efforts in low-income communities*. Retrieved October 29, 2015, from <http://www.ipg.vt.edu/Papers/Hallberg%20Major%20Paper.pdf>
9. *Start a community garden - community gardens - gardening*. (2015). Retrieved October 29, 2015, from National Parks Board: <https://www.nparks.gov.sg/gardening/community-gardens/start-a-community-garden>
10. Khew, C. (2015, November 21). FDA nod for GM salmon created by Singapore don. *The Straits Times*.
11. Lim, J. (2015, August 29). Design acclaim for 9m-tall system which beats more than 1,000 entries from 72 countries. *The Straits Times*. Retrieved October 29, 2015, from <http://www.straitstimes.com/singapore/vertical-farming-invention-wins-global-award>
12. Wilson, G. (2015, August 3). *Singapore's new business opportunity: Food from the roof*. Retrieved October 29, 2015, from <http://www.cityfarmer.org/singaporeroof.html>
13. Iowa's green young men. (2014, June 28). *The Straits Times*.
14. Mass fish deaths: Email warning against eating locally farmed fish a hoax, says AVA (2015, March 9). *Today*. Retrieved October 29, 2015, from <https://www.todayonline.com/singapore/mass-fish-deaths-email-warning-against-eating-locally-farmed-fish-hoax-says-ava>
15. Malaysia bans imports of Gala, Granny Smith apples from the U.S. (2015, January 18). *The Straits Times*. Retrieved October 29, 2015, from <http://www.straitstimes.com/asia/se-asia/malaysia-bans-imports-of-gala-granny-smith-apples-from-the-us>
16. *Video: SURE Lok Hom: The Case of the antique chairs*. (2015, June 1). Retrieved November 2, 2015, from S.U.R.E.: <http://www.nlb.gov.sg/sure/video-case-of-the-antique-chairs/>

