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Singapore, Factor 13: Demographics

Singapore: The Ever-Adapting Country

Today in the United States most people are fortunate enough to not struggle with even half of the problems that developing countries face. Clean water is accessible, fresh food is easily attained because of the local farms, healthcare is always available if needed, and the land is well maintained because it is tended by local workers. Students write these papers with little perspective on all of the problems that trouble others in the far reaches of the world, or even the terrible conditions that citizens of other countries are subjected to because they are sheltered from the truth. It is easy to cover the pain and misery by focusing on the positives in other lives. This is more than just a paper required for a class that will be forgotten later in life. By becoming more educated about the problems that are fixable and bringing them to life, people are more able to do as much as they can with the resources they have. Change of these unfortunate conditions people live in can be achieved by creating a plan to hopefully become a reality for places like Singapore.

The people of Singapore have learned that hard work and discipline will get them to where they want to be. The past generations have made education, healthcare, and jobs all comfortably available for the public. An average family in Singapore consists of the nuclear family much like the United States. The average employment income for Singapore is $23,972 dollars in 2005 (Singapore Average Salaries). This amount of money is hard to take care of a family on but it is possible for the family to survive with some close management.

The average adult literacy rate is 94.5% in 2008 (Singapore Education Stats). For a developing country this is extremely high and competes with the U.S. Also like in the United States, college is available to those who can afford it. The average years of schooling is 7 years and about 38% of adults go to college (Singapore Education Stats). Anyone who goes to a college or university gets better job opportunities. Finally, all healthcare is available to the public just like here in the United States and as the Ministry of Health in Singapore says, "Healthcare facilities are also required to maintain a good standard of medical/clinical services under PMHC Act/Regulations" (Healthcare Regulation).

What once started as a poor British colonial outpost with a small population and limited resources has become one of the wealthiest developing countries in the world. On August 31 of 1963, Singapore achieved full independence under Lee Kuan Yew (Lee Kuan Yew). The country thrived off of its strong economy despite the lack of land and resources. The plan for Singapore, and many other developing countries, worked like a chain reaction without needing the resources that other countries had. The plan was to focus on economic growth so that the people had good jobs and then the country would grow faster as a whole. Singapore has 5.4 million people currently living in it and just like in the past, the one natural resource that Singapore has are its people and they intended to use it to their advantage.

Lee Kuan Yew created a new system called the Economic Development Board (Lee Kuan Yew). It is an agency designed to encourage business and foreign investment. What Singapore lacks in other areas, they make up for in the economy. They used their own hardworking people, trained them to the best of their abilities, and hoped to teach some of their ways to others. They needed more of the same diligent hardworking people to come contribute to the country using their talents. The EDB was in charge of settling the foreign companies in Singapore and creating more growth. Once they made Singapore a great place for other businesses to set up their main headquarters, they made sure that the newcomers kept the peace and accepted the ways of the groups of people native to the country. The population is made up of

predominantly Chinese, Indians, and Malays. Singapore is 277.3 square miles (which is two-thirds the size of New York City) yet still maintains complete harmony between the three very different cultures in the small area they have to work with (How Big). Together, the country works to make it a great place, but still the problem rages on lying underneath the economic wealth.

Gathering more people to settle down and work in the country helps the economy but makes the lack of resources increasingly more dangerous to the thriving country than it was previously. One of Singapore's main problems is that population and buildings are continuing to grow larger and larger without gaining any more land. While building more housing, this leaves little space for farm land. Singapore grows less than 10% of its own produce and imports the rest from neighboring countries and sometimes all the way from the United States and Europe. (Vertical Farming). The lack of local produce and many imported goods means that taxes are high and the same foods that could cost less if grown inside the country cost almost twice as much. The cost of food alone is a giant chunk of even the wealthiest of the Singapore citizens' paycheck.

Just as the population is projected to increase to 9 billion people all over the world, Singapore is no exception. Singapore is projected to hold 6.1 million to 7.3 million people by 2050. Space and resources will not increase any as time passes and the problems that the demographics pose are steadily increasing in severity. Since 2007, gestation has been a problem for the small country that focuses its attention mostly on bringing more people inside its boarders (Population Outcomes). More houses will need to be built for the newcomers and more resources will have to be imported.

Unfortunately, for this developing country to continue to make progress or to just keep from collapsing on itself, it needs to keep bringing in the steady flow of foreigners to Singapore. So, there would be no logical reason to stop the population growth even if there was a good way to go about it. Without the population growing, the whole system the country originally grew from, will fall and bring everyone inside the boarders down with it. As well as citizens, everyone that relies on business from Singapore will also be in danger of collapsing on themselves. The increasing population brings more money in, and Singapore will be able to hold everyone by making more housing, but the farmland will need to be used for construction instead of growing produce for the local stores. Farmland will continue to dwindle until there is none left and Singapore will completely rely on imports of food for their people. Prices will then go up more than they already have because of the added taxes and overall expenses that come with connecting with other countries for goods. "As a nation that produces little food, Singapore must accept prices set by food producers. This means that any shifts in global food supply will affect Singapore, including increases in food prices" (The Food). No matter how substantial the growth in economy and how well the jobs pay, food bills will add up and hurt the poorer families especially.

"Singapore imports about 90% of all of the food consumed in the country" (The Food). This means Singapore is more prone to other challenges. They risk their food supply running short because of any outbreaks of food diseases in the countries that they import their food from. If they have one main supplier of beef or any dairy products and a new disease comes and infects the cows, Singapore will take a hit and be short on dairy products that year. They also have the danger of their food supply being cut off completely. This could be due to the closing of a port in countries that Singapore imports food from. Supply problems could also be a reality if there are political changes in neighboring countries. If a trade system was put in place by one leader, and another is elected or takes control, that deal might be shut down and a new deal would have to be negotiated.
As well as population growth, importing goods poses another threat; pollution may start to become a problem for Singapore as we start to completely cut down on any farming inside of the country. "Not only are the distances that food travels from farm to market important, but the modes of transport also have a large effect on how much pollution is generated. For example, importing food by airplane results in far greater emissions of greenhouse gases than imports by ship." (Food miles). Every mode of transportation

will cause pollution no matter what way you look at it. Over time, all of the extra miles that each truck has to travel will start to take a toll on the environment. The truck will have to pick up the produce from the shipments that have been flown or shipped in and then take each delivery to the different grocery stores across the country. Soon, the consumers will be paying for the gas needed to get the food to the store, the extra taxes to pay the initial seller, and also the grocer's for holding the product to buy. All of this for something that isn't as fresh, or tastes as nice as something grown local.

One way to keep the country alive while fixing the problem of the food prices, fresh food, and keeping imports to a minimum is to start vertical farming. "Vertical Farming is hydroponic food production in cities in multi-story greenhouses" (What is Vertical Farming). No hydroponic greenhouse has been made in a city yet, but the theory is that the government can use old skyscrapers that are abandoned or unused to create a multi-story farm that could feed potentially millions of people while saving the farmland. "The Vertical Farm will incorporate present-day technologies into a brand new kind of building, one that will bring food, water and energy to every person on the planet." (What is Vertical Farming). The amount of food a vertical farm would be able to produce can feed millions of people each year. "Blush Tomatoes, a 50-acre hydroponic greenhouse in Australia, produces 27 million pounds of tomatoes per year; that's enough tomatoes for 1.3 million people per year." (What is Vertical Farming). With this information, we could only assume that several of these greenhouses stacked on top of each other would create even more produce.

Energy is another problem for buildings this large, but the answer to that problem is parabolic mirrors. "A concave mirror, generally circular and with a parabolic cross-section, used to concentrate radiation reflected from its surface onto a central focal point, as in a parabolic antenna, otherwise known as a parabolic mirror. Every vertical farm would be unique in its construction because everyone will be constructed for the specific food needs and natural renewable energy resources of each location. "OLED lighting is a proven technique for growing food indoors and is also an option for Vertical Farming." (What is Vertical Farming).

Also, instead of being energy intensive, "…it would capture all passive energy—solar, wind, geothermal, hydro—and use plasma arc gasification to turn human waste and unused plant parts into energy. The Vertical Farm would augment, not take away from, its city's energy grid" (What is Vertical Farming). This would lower the inhabitants of Singapore's heating costs, boost food production and then they would be able sell electricity back to their local power providers, which would reduce the reliance on fossil fuels.

In Singapore, this isn't a new concept. A small business called Sky Greens was thought of after Jack Ng, Managing Director of Dj Engineering, went through a financial crunch in 2009, he said "Food prices were going up because of supply disruptions overseas, so I had the idea of growing more food here". (Vertical Farming). It took him two years to develop the idea and put it into action. "It is the first low carbon hydraulic water-driven vertical system in the world to grow tropical-vegetables vertically in the tropics, which gives significant yield and uses less water, energy and natural resources, to achieve a sustainable green high-tech farm." (Vertical Farming). The structure of these vertical farms are in an A shape instead of a flat 50 acres like the ones that are constructed in Australia. "Each tower consists of 22 to 26 tiers of growing troughs, which are rotated around the aluminum tower frame at a rate of 1mm per second to ensure uniform distribution of sunlight, good air flow and irrigation for all the plants." (Vertical Farming). The rotation system doesn't need an electrical generator. It is powered by a gravity aided water-pulley system that uses only one liter of water, which is collected in a rainwater fed overhead reservoir. The energy needed to power one A frame amounts to one 60-watt light bulb. "This farming system generates significantly higher yields than traditional growing methods — they are safe, of high quality, fresh and delicious. Large varieties of tropical vegetables are grown, such as, Chinese cabbage,

spinach, lettuce, xia bai cai, bayam, kang kong, cai xin, gai lan, nai bai, etc. As the farm expands, Sky Greens intends to grow more vegetables" (Vertical Farming).

The vegetables are harvested every day and delivered almost immediately to the markets. Although Skygreens' vegetables cost about ten percent more than the imported vegetables now, they are selling very quickly because consumers are happy to buy Singapore grown produce. After the vertical farming is developed more and more, the prices will go down and the system will be very efficient. Just like the first cellphones, they were big, bulky, and expensive but over time they have become slimmer and more efficient just like vertical farms will be.

Because the Economic Development Board deals with new businesses and helping them merge into the Singapore area, they should be very much involved in the dealings of new vertical farms. They could ask other foreign investors to come and help the project along while getting some of the profits that this great idea will make. The idea of vertical farming, especially in an urban country like Singapore, is an almost guaranteed money maker for everyone involved. Any other foreign investors that decide to help will speed up the construction and overall research to improve the concept of vertical farming.

Not only would the Economic Board of Development step in and be a major factor in the vertical farming expenditures, but the national government would need to step in and contribute to the construction of materials and restoration of skyscrapers needed for vertical farms. This would create more well-paying jobs for the people of Singapore as well as boost the economy.

A barrier that would make it difficult for the government to help are the lack of property owned by the government itself. The foreclosed or otherwise unused buildings in the heart of Singapore's cities are owned by the banks similar to the United States. For the banks who own these dilapidated skyscrapers, it would cost more money to tear it down than it would to leave it in the neglected state it is in. If they transformed the building into a vertical farm, the structure would be put to use, thus making use of an otherwise unused resource while making fresh food available in the same country it was grown. The government would give farm subsidies to the banks willing to transform the buildings into farms and stipends to secure and ensure the income of the people working of the project. The banks who own the property can either start a farming sector inside their businesses or contract other companies like SkyGreens to work in urban areas. The extra financial help would ensure that the farms would continue to be funded and there would be plenty of money to pay for the employees hired to work if the farms don't profit as quickly as expected.

The entire project will seem like an exorbitant amount of money initially but it will pay for itself and more over time. The amount of pollution created by vertical farming would be little to none after you take into consideration how it creates energy from human and plant waste and recycles it through the farms. It would make environmental and economic sense for the government to regulate the creation of the structures and make sure the produce is being properly tended to.

Vertical farming would be a good solution to the fresh food problem in Singapore. The almost entirely urban country makes it difficult for local food to be grown and over 90% of the produce that is consumed in the country is imported. Vertical farming would cut down on most of the imports and reduce the money spent and pollution wasted on the transportation of goods. While becoming more self-sustainable in the agriculture department, this decreases the possibility of their food supply running short or supplies completely being cut off by diseases or political disturbances. The population could continue to increase and the farmland could be used for buildings now instead of growing a small amount of crops. Energy wouldn't be wasted, and the new vertical farming buildings would be able to produce more than they used in the first place.

From the very beginning of its origins, Singapore started as a small British colonial outpost with no land and not many resources, but the people that inhabited the land had a dream. If we know anything about the people that call Singapore home, it is that they are hard workers and nothing can stop them from achieving their goals. With a little bit of help and guidance along the way from more developed countries like our own and with some teamwork, we can all make Singapore an even better place than it is now.

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