Kailey Butler
Pine Grove High School
Ripley, MS USA
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Singapore's Warming World: Building a Safety Net for a Hotter, Wetter Future

Imagine you're at a beach, the sun beaming down on you. You apply sunscreen just as a precaution for your skin, and then sit down to enjoy the 80-degree weather. After half an hour, sweat beams from your skin. Each year you return, but the temperature climbs higher and the minutes of comfort grow shorter. Twenty-five, then twenty, then fifteen, and now just ten minutes of being outside in the heat is unbearable. This scene mirrors the reality for Singaporeans, who since 1984 have consistently dealt with rising local temperatures due to global climate change. Yet despite this growing discomfort, people remain focused on short-term economic growth and technological convenience over long-term climate solutions. While climate risks are often discussed, few stop to consider how cities are prepared, governed, or lived in. Without lasting solutions, today's bearable moments outdoors may become tomorrow's unbearable reality. Climate change also threatens Singapore's food security because the country depends heavily on imported food and has limited land for farming. A solution must protect not only people from extreme weather but also the food and water systems they depend on. Singapore should build a long-term "safety net" of water storage, heat-resistant crops, and smarter flood protection to keep its citizens safe and food secure as the climate changes.

Nestled just 85 miles north of the equator at the tip of Southeast Asia, Singapore is home to nearly six million residents living within one of the most densely urbanized nations in the world (Worldometers). Despite its small land mass, Singapore has developed into a major global hub for finance, trade, and education (Cultural Atlas). This rapid growth is held together by a government led by the prime minister, in which the people are ruled under a unitary parliamentary system. This concentration of authority allows for efficient policymaking, strict regulation, and long-term planning, factors that directly shape how space, resources, and daily life are managed across the country (Prime Minister's Office Singapore). This strong government planning is important because Singapore has limited land and must carefully manage the resources available to its people.

As a result of this planning and land availability, the majority of Singaporeans live in high-rise government-supported housing complexes. Averaging just over three people per household and earning a median income of 5,000 SGD from jobs in services, nursing, and administration, Singaporeans sustain heavy diets of stir-fried rice, fish, and vegetables from wet markets or hawker centers ("Statistics Singapore"). Citizens also benefit from reliable public infrastructure, such as clean water, toilets, electricity, telephones, and roads, as well as universal healthcare through affordable systems like MediShield, Medisave, and subsidies (Chien, Lee). In education, Singapore provides a wide range of public schools and private schooling options, supported by a rigorous public education ladder spanning from kindergarten to college. One national report summarizes, "Today, all Singaporeans, rich or poor, young or old, enjoy clean air, water, and sanitation, quality healthcare and education" (A Sustainable and

Resilient Singapore). Because Singaporeans already depend on reliable public systems, protecting these systems from climate change is important for the country's future.

Despite these strengths, Singaporean families struggle with vulnerability rooted in the nation's climate and geography pressures (Meteorological Service Singapore). As a low-lying island, Singapore is exposed to high humidity, flash flooding, and rising sea levels. Experts warn of the potential crisis that 30% of the country's land area could submerge before 2100 if these trends continue. In addition, national climate records show that temperatures have risen by approximately 0.24°C per decade in Singapore since 1984, with 2024 tying as one of the hottest years on record (National Climate Change Secretariat). These changes can affect where people live, how they work, and how food and other necessities are produced and transported.

As climate change worsens, rising ocean temperatures and unpredictable storms make it harder to move goods safely and on time. This disrupts the shipping routes that Singapore relies on for essentials like rice, seafood, and fresh produce (Singapore Food Agency). At the same time, extreme droughts and heatwaves in major supplier countries like Malaysia, Thailand, and China cause crop and livestock production to drop tremendously (Food and Agriculture Organization of the United Nations). When exporting countries experience poor harvests, they reduce shipments to protect local supplies, which raises prices for local Singaporeans (Food and Agriculture Organization of the United Nations). This creates a major food-security problem because Singapore cannot depend completely on other countries for food when those countries are facing climate disasters themselves. Increasing local food production and creating backup systems would give Singapore more control over its food supply.

Rising food prices and climate pressures do not affect local Singaporeans equally. Low- and middle-income families feel the impact first, as a larger portion of their income goes to groceries (Singapore Department of Statistics). Climate change also places additional strain on the elderly population. According to a demographic study titled "How Is Climate Change Knowledge Distributed," older adults face a higher risk of heat stress and various health-related complications as temperatures continue to rise (MDPI). Migrant workers are also vulnerable, as they often live in crowded dorms near industrial areas that are prone to flooding or are extremely hot, increasing the risk of unlivable heat conditions (Royal Society Publishing). Farmers, businesses, and the government are also important stakeholders because they would have to help pay for, build, and maintain the systems needed to protect food, water, and communities. Because these groups are affected differently, the solution must benefit the entire population instead of focusing on only one group.

Even though Singapore has started taking steps to solve its climate crisis and protect its citizens, it is relying heavily on short-term fixes rather than long-term solutions. The government created national climate plans that aim to cut greenhouse gas emissions, adopt renewable energy, and use low-carbon technology (Prime Minister's Office Singapore). They are investing in flood defenses and coastal protection projects to prepare for rising sea levels and heavier rainfall, especially in low-lying areas (National Climate Change Secretariat). Finally, a "30 by 30" plan aims to produce 30% of the country's food locally by 2030 using innovations like vertical farming and high-tech greenhouses (Singapore Food Agency). Singapore's current plans, like NEWater water recycling, sea walls, pumps, and indoor farms,

work well today but can't be relied on forever. Climate change has no cure, but there can be long-term solutions to help improve the lives of citizens globally. Instead of replacing these programs, Singapore should build on what is already working and connect the systems together.

Based on these efforts, the key idea should be to create a "safety net" of walls, farms, and water systems to keep people safe and fed. Right now, Singapore is currently working on a resilience plan using water recycling like NEWater to turn seawater into safe drinking water to supply what 6 million people drink a day without running out. They also have sea walls and pumps to fight floods, and in 2025 spent $5 billion for stronger ones (Singapore Department of Statistics). Plus, indoor farms grow things like greens, tomatoes, and fish such as tilapia in controlled buildings (National Climate Change Secretariat). This plan seems to have a good base, but adding a few more touch-ups would make it more efficient. These changes are realistic because they build on Singapore's existing technology, infrastructure, and experience instead of requiring the country to completely change how it produces food or manages water.

Water is the most important starting point because without it people would thirst and farms wouldn't grow. A key improvement would be to build "water banks"—huge hidden tanks below flood levels that store extra water from heavy rain or hold NEWater so there is a steady backup during dry spells. Then, install battery-powered pumps at crucial points around the city so if Singapore experiences a blackout, the power can cut back on within seconds using the stored power to keep liters of water flowing. These pumps and tanks can be linked to phones to warn citizens to "Save Water Today" or to show when tanks are full or empty. This setup can turn scary situations into something reliable and worry free, giving people the peace of mind that water will always be there. It would also help farms continue producing food during dry periods, making the water system directly connected to Singapore's food security.

To complete the "safety net," farms need to be tougher and walls need to be smarter. During hot weather, seeds tend to dry up, causing production shortages. Singapore needs to develop lab-grown seeds that can withstand the heat using parts of rice or spinach plants that already handle some heat, like leaves, stems, or tiny seed parts. Then, run tests before sending them out to local farms to guarantee a more reliable food supply. This would help local farmers continue producing crops even when temperatures rise. It would also reduce some of Singapore's dependence on imported food when other countries are experiencing droughts or heatwaves. For walls, use AI drones equipped with cameras for mapping the coastline in a few months' time rather than years. They can pinpoint ideal spots for things like fast-rising flood gates that go into place during surges, helping protect homes, farms, roads, and businesses in vulnerable areas. These small upgrades bring food, water, and flood protection into one system that keeps Singapore ahead of climate chaos.

The "safety net" would have an impact on more than just the environment. Low- and middle-income families could benefit from a more reliable food supply and less risk of sudden price increases caused by shortages. Farmers could have stronger crops that survive higher temperatures, while businesses could face fewer disruptions to food transportation and infrastructure. Older adults and migrant workers could benefit from stronger protection against extreme heat and flooding. Most importantly, the government would have a stronger system for responding to several climate problems at the same time. By connecting

water, food, and flood protection, Singapore would be better prepared instead of waiting until a crisis happens.

Singapore's warming world needs this lasting fix to ensure that during unbearable weather, its citizens are prepared with food supplies and safe water. By adding to the current plan—water banks, heat-proof seeds, and AI drone mapping—the city will build a true "safety net" of linked water, walls, and food systems. These solutions are feasible because they build on Singapore's existing use of technology, water recycling, indoor farming, and flood protection. Climate change can't be cured, but this strategy can reduce its effects and keep nearly 6 million people safer, fed, and thriving—no matter how hot or wet things get.

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