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## **Saving Australia's Wasted Food: From the Farm to Us**

Australia produces enough food to feed about 3 times its population, and yet it still has food insecurity. In 2021, 1 in 6 adults haven't had enough to eat in the last year, and 1.2 million children have gone hungry. These trends are continuously worsening with the COVID-19 pandemic (Keck, 2021). This issue has been especially prevalent in indigenous populations, low-income earners, and people who are socially or geographically isolated (Understanding Food Insecurity in Australia, n.d.). Historically marginalized populations like Aboriginal and Torres Strait Islander peoples are most often disproportionately affected by food insecurity, with 28% more food insecurity than the general population. How is it possible for surplus and insecurity to coexist?

The truth is, Australia wastes the most food per capita in the world, with over 300 kg of food wasted per person each year, 7.6 million tonnes total (Earth.org, 2021). To understand this complex issue, we must first understand its magnitude. Let's use an example: potatoes. Arguably the most versatile, and statistically the most wasted food in Australia after bread and milk (River Cottage, n.d.). It's estimated that a whopping 100,000 tonnes of potatoes are lost each year in South Australia alone (Lim, 2020); to visualize it, that's equal to the weight of over 4 Statues of Liberty. How is so much waste produced? The issue of food waste is a product of perfect produce culture, spoilage during transportation, leftover food in markets, consumer waste, and an overall lack of awareness. These problems arise from various sectors of the food supply chain, from source to consumer. Let's begin from the start of all our produce: farms.

Farms produce 31% of Australia's food waste, and there are various reasons why so much produce never leaves the farm. Crops might be wasted because they aren't economical to harvest, or don't fit the needed requirements. Retailers in Australia have very specific standards for crops due to a perfect produce culture, where consumers expect their fruits and vegetables to have a flawless appearance. To illustrate, let's go back to the topic of potatoes. Potatoes need to look a certain shape, size, and even colour (Lim, 2020). With so many requirements, statistics show that while South Australia produces up to 80% of Australia's potatoes, up to 40% don't reach the specifications required by the retailers and are eventually thrown away (Spudman, 2020). Other crops also face the issue of perfect produce culture, creating a tremendous amount of waste all for the sake of appearance.

Finally, farmers themselves must also filter out crops that don't have the freshness needed, as this could risk it being spoiled during transport, as well as the entire load. For a huge country like Australia with a diameter of over 4000 km, maintaining freshness throughout the long trip is an especially important issue. Combined, it's estimated that 25% of crops never even leave the farm, resulting in losses for farmers and the environment. Food waste costs farmers about \$2.84 billion annually, with resources like 2600 gigaliters of water being wasted on growing crops that are never sold (Australian Academy of Science). Meanwhile, Australia is on the brink of a water crisis; it is projected that by 2030, the amount of water available will not meet the country's demand (The University of Sydney, 2020). From the farm alone, we can see two major issues: culture and transportation.

Culture is often an underestimated factor of waste- whether it be in terms of food or other resources- since it's hard to quantify. Australia has about 394 hectares of arable, or fertile land (Australian Bureau of Statistics, 2018), and with so much food being grown, naturally, the people also have higher standards for food. From the farm to the market, and to the home, the high standards for produce are often one of the main reasons food is thrown away. People are subconsciously influenced to feel stigmatized against

“ugly” food to some extent. From supermarket advertisements to literature, we are convinced that appearance is linked to taste. America has had the same issue by sharing this stigma and having large amounts of arable land. However, recent solutions have slowly, but steadily chipped away at this problem. Borne by startup businesses like Misfits Market and Imperfect Produce, “ugly produce culture” has raised awareness for this issue by promoting buying produce that doesn’t fit our aesthetic standards of food that we would normally buy (Vines, 2022). By selling produce that normally wouldn’t have even made it to the display case, Imperfect Produce, for example, has saved over 30 million pounds of food (Snyder, 2018).

Yet, would people be willing to purchase disfigured food even after learning that it doesn’t affect taste? Some people may still be reluctant to purchase “ugly” foods, a potential issue Brain Roe, a professor at Ohio State University understood. By performing a study with 1300 participants, he found that most consumers would purchase deformed carrots for a small discount (Qi, 2021). This small amount of money would not prevent markets from profiting, and would also cut food waste. To add on, Roe suggests the possibility of food discounts for disformed food to decrease the national standard for produce. As more “ugly” produce is introduced to the market, consumers would have an increased tolerance for them and become more willing to purchase misshapen produce (Marin, 2021).

If campaigns are created by Australia’s Department of Climate Change, Energy, Environment, and Water (DCCEE) to raise awareness for and to encourage people to buy “ugly” food as Imperfect Produce did in America, people would be more willing to buy products that do not meet these qualifications. Additionally, including discounts for “ugly” produce would further coax consumers and in the long-term, allow ugly produce to be normalized in Australia. With this, retailers would also decrease their standards for produce, therefore allowing farmers to throw away less of their crops, which decreases overall food waste.

Yet, what about the produce thrown away because it’s not fresh enough for travel? As mentioned previously, only food that is as fresh as possible can be transported across such a large country. This is done to decrease the risk of it spoiling, and in consequence, spoiling the whole batch. Not only is food wasted due to transportation, but there are various points in which food is wasted directly due to or related to spoilage. To ensure the freshness of produce so that less food is wasted, better transportation and storage methods should be incorporated. To do this, improved cold-chain systems should be used to maintain the freshness of foods being shipped. Cold-chain systems are integrated systems in which optimum temperatures are maintained from the source, farms, to consumers, us. Mere refrigerating can only do so much and is useless if the produce is not connected to a consumer in time. However, incorporating cold-chain systems through the government would be much more efficient.

Cold-chain systems consist of six stages: harvesting, preconditioning, transport, bulk storage, retail, and domestic food service. To do this, networks of pre-conditioning, packhouses, factories, vehicles, containers, storages, and wholesale/retail establishments- all with seamless temperature control are required (UN Environment Programme). In addition, to accommodate the large area of Australia, the government should fund refrigerated warehouses to be used for produce during transit. Not only will food waste from transit be decreased, but more food will be sold in the market. Though some may feel concerned about funding such a large operation, overall more taxes can be collected with an existing Goods and Services Tax (GST) of 10%, allowing the government to pay off its national debt and use the money for important causes such as food waste (Australian Taxation Office, 2021). One other thing to consider is that although this will reduce methane emissions from the spoiling of food waste, there will be increased CO<sub>2</sub> emissions from refrigeration unless properly handled. To make sure that this system does not negatively impact the environment, non-fossil fuels should be used to power the systems, and low-GWP refrigerant technologies should be used as well (UN Environment Programme). Being located

in the Southern Hemisphere, Australia receives lots of sunlight: for example, Tennent Creek in the Northern Territory receives an average of 9.8 hours of sun a day. This suggests the potential use of solar panels to power the refrigeration technology, taking advantage of Australia's natural resources (Osborn, n.d.). This would all be managed through The Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) and the DCCEEW (Department of Infrastructure, 2022). Overall, incorporating cold-chain systems throughout Australia would be a tremendous aid throughout various parts of the consumer chain, such as from the farm to retailers like grocery stores.

This brings up the next issue: food being thrown away in markets because it isn't sold in time, and food insecurity existing simultaneously. To battle this rising problem, nonprofits such as SecondBite and OzHarvest have worked to collect leftover food from supermarkets, restaurants, and other places and distribute them to charities. Such organizations have been a true help to food relief in the most food-insecure areas. They have also benefited the environment by making use of food that would have gone to waste otherwise, releasing more greenhouse gases into the atmosphere (Walla, n.d.).

To further the idea of donating food that isn't sold, adopting France's Food Waste Law would support and extend the goal of fighting food waste. France used to be one of the top food-wasters in the world, but they have now become a global leader in curbing food waste after adopting this law in February 2016. This law forbade supermarkets from destroying unsold food products, compelling them to donate them instead. This groundbreaking law has decreased food waste and insecurity in France. (Saltzman, 2019). Having a similar problem, this law would be incredibly beneficial to Australia. With 90% of its population living in urban areas, transportation to a donation site would not be difficult. As proven by France, these laws can be highly effective if they are implemented in Australia.

However, the potential problem of markets facing losses in transporting the food to donation sites exists. A solution to this would be to create an app that locates nearby shelters or places that need food. With a fee for throwing away unsold food, retailers would be more motivated to use apps like these to donate leftover food. Currently, apps like KARMA and OLIO are used in the United Nations for people to give away or sell food for a lower price. OLIO, for example, allows users to create listings shared with users nearby. When people are interested in a good, they can send a message requesting the listing and agree on a time and place to meet (OLIO, n.d.). Similar to OLIO, nearby shelters or other donation sites near a market could be shown with some of their necessities listed. Markets would then reach out to and go to a site with the food, making donations much more convenient for markets.

Finally, the most important part of food waste in the consumer chain is, of course, the consumers: us. Households are the biggest contributors to food waste in Australia, accounting for about 34% of waste created. Each person wastes about 300 kgs of food in a year, which to more easily conceptualize, is like throwing away 1 in 5 bags of groceries (Food Bank, n.d.). Most Australians are unaware that they are wasting so much food: in a survey in 2011, only 9% of participants thought that they were wasting more food than they should when they were throwing about \$2000 worth of food away per year (Pearson, 2011). Culturally, Australian households often cook more food than they consume, making large amounts of leftovers a norm.

Inhabitants of Australia must be first made aware of this issue, so educational events would be largely beneficial to helping Australians become more conscious of their food waste, and motivating them to decrease this waste as much as possible. Although often overlooked due to being a more indirect solution, education is a crucial part of managing food waste. This can be seen in France, in which it has played a pivotal role in decreasing its food waste. In 2015, a bill was approved by the French Parliament so that addressing food waste is mandatory in schools (NRDC, 2015). By helping the youth to value food and reduce its waste, France has become the world's most food-sustainable country (The Economist Intelligence Unit, n.d.). Such education programs could be implemented in Australian schools, which

already have an Earth and Environmental Sciences Unit in their curriculum. Already, Australian organizations such as Youth Food Movement (YFM) are working hard to educate people about Australia's food system, like understanding where our food is coming from and how much food waste is being created (YFM, n.d.). Such activism must be continued and supported. For example, the government could support food education organizations like YFM by dedicating nonprofit award grants to this cause.

Awareness is important to the issue of consumer food waste, but it must also be enforced. It is no secret that money is most often one of the biggest motivators to markets and consumers alike. In a survey, it was found that 51% of people are motivated to decrease their food waste in order to save money (Fight Food Waste, 2019). To encourage and push people to be more mindful of the food they waste, a pay-as-you-throw law could be incorporated so that people have to pay for their food waste to be taken away. Once gathered, the food waste is composted or made into biofuel. This system was first created in South Korea and has since then significantly decreased the food waste produced in this country, and has also increased the percentage of recycled food waste from 2% to 92%. Inhabitants would have to pay for their food waste based on their weight, which is calculated and charged by machines at small centers in apartments (New York City Food Policy Center, 2019).

One reason South Korea is able to implement this system is thanks to having a highly urban population of 81%. A strength of living in an urban area is convenience; with a more densely packed population, all necessities are at arm's length. In Korea, residents of apartments merely have to step a few feet out to their nearest food waste machine. Is Australia urban enough to apply this solution effectively as South Korea did? As mentioned previously, approximately 81% of South Koreans live in urban areas, compared to over 90% in Australia. In addition, South Korea's most populated city, Seoul, has a population density of around 15,900 people per square km. On the contrary, Australia's most densely populated city, Melbourne, has a population density of over 33,100 people per square km (South Korea Urban Population, n.d.). This makes Australia an even more urban country than South Korea, suggesting that the pay as you waste system may even work more efficiently in Australia. Similar to South Korea, apartments would have food waste centers conveniently located, as well as some in areas such as community centers in more suburban areas. This system would be created by the DCCEEW in collaboration with the Waste Management Association of Australia (WMAA), and funded by the government. Money made from the food waste payments could be used to install more of these machines throughout the country and continue to build a more food-waste-free Australia.

Australia's issue of food waste is made up of a series of problems from source to consumer, but with the right solutions, we can cut our food waste. This all starts with growing tolerance for "ugly" produce, inputting cold-chain systems to prevent spoilage during transportation, obliging markets to donate leftover food rather than destroying it, creating a pay-as-you-waste system, and overall raising awareness for the issue of food waste. As famous Australian botanist Timothy John Entwisle says, "If we keep faith with science, and [think] things through, and [keep] ourselves alert, we will find new things, and new solutions. As humans, we do find answers to problems. Some things are harder than others. But that just means you have to work harder." Everyday, we're finding new solutions to combating food waste, and the food insecurity caused by it. Although some may be more difficult than others, we must all keep pushing to ensure that *everyone* has enough to eat.

## Works Cited:

- 1.2 million Australian Kids went hungry last year amid 'most challenging time on record': Report. Global Citizen. (n.d.). Retrieved February 15, 2022, from <https://www.globalcitizen.org/en/content/foodbank-australia-2021/>
- 15 countries that waste the most food. Earth.Org - Past | Present | Future. (2021, January 11). Retrieved February 14, 2022, from <https://earth.org/countries-that-waste-the-most-food/>
- About YFM. Youth Food Movement. (n.d.). Retrieved February 14, 2022, from <https://www.youthfoodmovement.org.au/about-yfm>
- Alexandra. (2020, January 31). The versatile potato. Land O'Lakes. Retrieved February 14, 2022, from <https://www.landolakes.com/expert-advice/the-versatile-potato/#:~:text=by%20Alexandra,The%20potato%20is%20one%20of%20the%20world's%20favorite%20foods%2C%20beloved,%2C%20roasted%2C%20microwaved%20or%20fried>
- Australian Taxation Office. (2021, July 05). GST. Retrieved August 3, 2022, from [https://www.ato.gov.au/business/gst/#:~:text=Goods%20and%20services%20tax%20\(GST\)%20is%20a%20broad%2Dbased,are%20called%20GST%2Dfree%20sales.](https://www.ato.gov.au/business/gst/#:~:text=Goods%20and%20services%20tax%20(GST)%20is%20a%20broad%2Dbased,are%20called%20GST%2Dfree%20sales.)
- Department of Infrastructure, Transport, Regional Development, Communications and the Arts. (2022, August 02). Department of Infrastructure, Transport, Regional Development, communications and the Arts. Retrieved August 3, 2022, from <https://www.infrastructure.gov.au/>
- Food waste Australian household ... - fight food waste CRC. (n.d.). Retrieved February 14, 2022, from [https://fightfoodwastecrc.com.au/wp-content/uploads/2019/11/Summary-Report\\_final.pdf](https://fightfoodwastecrc.com.au/wp-content/uploads/2019/11/Summary-Report_final.pdf)
- NRDC. (2015, September). France Food Waste Policy Report. Retrieved August 2, 2022, from <https://www.nrdc.org/sites/default/files/france-food-waste-policy-report.pdf>
- Land Management and farming in Australia, 2016-17 financial year. Australian Bureau of Statistics. (n.d.). Retrieved February 14, 2022, from <https://www.abs.gov.au/statistics/industry/agriculture/land-management-and-farming-australia/latest-release#:~:text=At%2030%20June%202017%20there,increase%20on%202015%2D16%20estimates.>
- Larissa. (2020, July 15). Food waste: Preventing a multi-billion dollar problem. Curious. Retrieved February 14, 2022, from <https://www.science.org.au/curious/earth-environment/food-waste-preventing-multi-billion-dollar-problem>
- Lim, G. Y. (2020, April 28). Spuds success story? Aussie plans to turn potatoes into prebiotics, low-gi ingredients and vodka. foodnavigator. Retrieved February 14, 2022, from <https://www.foodnavigator-asia.com/Article/2020/04/28/Spuds-success-story-Aussie-plans-to-turn-potatoes-into-prebiotics-low-GI-ingredients-and-vodka#:~:text=Unwanted%20potato%E2%80%8B,are%20lost%20every%20year%E2%80%8B.%E2%80%9D>
- Martin, A. (2021, December 20). What would make consumers buy ugly produce? Retrieved August 3, 2022, from <https://seedworld.com/what-would-make-consumers-buy-ugly-produce/>

- OLIO. (n.d.). Retrieved August 3, 2022, from <https://olioex.com/>
- PEARSON, D., & MINEHAN, M. (1970, January 1). Food waste in Australian households: Why does it occur? University of Canberra Research Portal. Retrieved February 14, 2022, from <https://researchprofiles.canberra.edu.au/en/publications/food-waste-in-australian-households-why-does-it-occur>
- Population density (people per sq. km of land area). Data. (n.d.). Retrieved February 14, 2022, from <https://data.worldbank.org/indicator/EN.POP.DNST>
- Qi, D., Penn, J., Li, R., & Roe, B. (2021, November 25). Winning ugly: Profit maximizing marketing strategies for ugly foods. Retrieved August 3, 2022, from <https://www.sciencedirect.com/science/article/abs/pii/S0969698921004008?via%3Dihub>
- Running out of water. (n.d.). Retrieved August 3, 2022, from <https://www.sydney.edu.au/engage/events-sponsorships/sydney-ideas/2020/water-resource-and-climate.html>
- Saltzman, M., Livesay, C., Martelli, J., & Gouffran, D. (2019, August 31). Is France's groundbreaking food-waste law working? PBS. Retrieved February 14, 2022, from <https://www.pbs.org/newshour/show/is-frances-groundbreaking-food-waste-law-working>
- Sheldon, M., & Sheldon, M. (2021, March 11). South Korea recycles food waste in effort to become zero-waste society. NYC Food Policy Center (Hunter College). Retrieved February 14, 2022, from <https://www.nycfoodpolicy.org/food-policy-snapshot-south-korea-food-waste/>
- Snyder, H. (2018, October 3). How imperfect produce saved 30 million lbs of food one "ugly" avocado at a time. Yellow Co. Retrieved February 14, 2022, from <https://archive.yellowco.co/blog/2018/10/03/imperfect-produce-saved-30-million-lbs-ugly-food/#:~:text=Imperfect%20has%20already%20had%20immense,impact%20on%20our%20food%20system>
- South Australia invests in plan to utilize undesirable potatoes. Spudman. (n.d.). Retrieved February 14, 2022, from <https://spudman.com/news/south-australia-utilize-plan-undesirable-potatoes/>
- South Korea Urban Population 1960-2022. (n.d.). Retrieved August 3, 2022, from <https://www.macrotrends.net/countries/KOR/south-korea/urban-population>
- Surprising facts about food waste. Foodbank. (2022, January 7). Retrieved February 14, 2022, from <https://www.foodbank.org.au/food-waste-facts-in-australia/?state=au>
- Sustainable cold chain and Food Loss ... - ozone secretariat. (n.d.). Retrieved February 14, 2022, from [https://ozone.unep.org/system/files/documents/MOP31-Sustainable-HL\\_Briefing\\_Note.pdf](https://ozone.unep.org/system/files/documents/MOP31-Sustainable-HL_Briefing_Note.pdf)
- The Economist Intelligence Unit. (n.d.). Food and nutrition sustainability. Retrieved August 3, 2022, from <https://foodsustainability-cms.eiu.com/>
- Top Five most wasted foods (and ways to save them from the Bin). Top five most wasted foods (and ways to save them from the bin) | River Cottage. (n.d.). Retrieved February 14, 2022, from <https://www.rivercottage.net/news/top-five-most-wasted-foods-and-ways-to-save-them-from-the-bin>

Understanding Food Insecurity in Australia. (n.d.). Food and nutrition sustainability. Retrieved August 3, 2022, from <https://foodsustainability-cms.eiu.com/>

Varela, V. B., Batkai, M., Seeley, E., Rhoads, E., Tobias, N., Payne, E., Kaufman, J., Luong, L., Bond, S., Hurst, G., & Nierenberg, D. (2019, January 30). 21 organizations transforming Australia's Food System. Food Tank. Retrieved February 14, 2022, from <https://foodtank.com/news/2019/01/21-organizations-transforming-australias-food-system/>

Vines, B. (2022, January 12). Ugly food fight: Misfits market, Imperfect Foods, and the battle against Food Waste. Consumer Reports. Retrieved February 14, 2022, from <https://www.consumerreports.org/food-shopping/ugly-food-fight-misfits-market-imperfect-foods-food-waste-a6326488257/>