Escondido Community Advisory Group on Environmental Impacts and Climate Action: Solid Waste Management Recommendations

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City of Escondido Zero Waste Recommendations

The global population is expected to reach 8.5 billion by 2030, 9.7 billion by 2050, and 11.2 billion by the end of the century.[1] North America is home to 5% of the world's population and it consumes 30% of the world's resources.[2] Cities only take up 2% of the world's land area but are responsible for 60%-80% of the world's energy consumption and 75% of global CO2 emissions; roughly the same amount of raw materials are consumed.[3] Cities are focused areas of production, consumption, and waste.[4] In addition, these characteristics put a lot of pressure on city infrastructure, such as water supply, solid waste recycling, and environmental pollution. Cities are increasingly becoming reliant on urban areas to supply management of waste and related substances.[5] Solid waste disposal sites, including landfills are responsible for 5%-20% of global methane emissions, and up to 4% of total anthropogenic (human caused) greenhouse gas emissions.[6] In 2009, 32% of all food produced globally was lost or wasted.[7]

From extraction of raw materials, to the disposal of the goods they are used to create, the creation of stuff requires energy mostly from fossil fuels.[8] In the past 3 decades, to support this consumer lifestyle, ⅓ of natural resources have been used, less than 4% of original forests in

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[1] Koop, S.H.A., van Leeuwen, C.J. "The challenges of water, waste and climate change in cities" *Environ Dev Sustain* 19, 385–418 https://doi.org/10.1007/s10668-016-9760-4, 2017.
[2] *The Story of Stuff*. *The Story of Stuff Project*, 2009. https://youtu.be/9GorqroigqM.
[3] Koop, S.H.A., van Leeuwen, C.J. "The challenges of water"
[4] Koop, S.H.A., van Leeuwen, C.J. "The challenges of water"
[5] Koop, S.H.A., van Leeuwen, C.J. "The challenges of" 385–418
[6] *The Story of Stuff*. "*The Story of"*
[7] Koop, S.H.A., van Leeuwen, C.J. "The challenges of" 385–418
[8] "Climate Change and Waste." EPA. Environmental Protection Agency, September 29, 2016. https://19january2017snapshot.epa.gov/climatechange/climate-change-and-waste_.html.

America are left, and a stunning 40% of waterways in the U.S. are not safe for consumption.[9] In the U.S, energy used to produce, process, transport, and dispose of products account for 42% of greenhouse gas emissions; traditional waste management methods produce 1%-5% of emissions.[10]

Linear System

There is no "throw away, " waste does not just disappear. Waste goes to a landfill or an incinerator and then to a landfill. In an incinerator waste is burned, releasing toxic chemicals into the air as well as greenhouse gases; landfills also release greenhouse gases. Society has become disposable and has been designed around a framework of convenience. Using single-use plastic bags, take-out containers, cutlery, coffee cups, napkins, has become the norm in the past 50 years. The general public's conception of waste ends with taking the trash out to the curb or tossing it in a dumpster. There is no thought about where waste goes or the impacts it has on the environment and human-beings. Moreover, food waste is also seen as trash, simply tossed in with everything else in the garbage bin; as the population increases, it is natural that waste will increase as well. Waste is intricately woven with the converging threats of climate change, overpopulation, and environmental degradation. There is only a small window of opportunity left to mitigate climate change away from existential consequences, and it will require society to transition away from norms and values that are associated with a necessity around exponential consumerism. **It starts with developing a conscience around the system of how stuff is extracted, produced, consumed, and disposed of, and most importantly developing the infrastructure that allows for sustainable management and production of it. The most**

[9] The Story of Stuff. "*The Story of"*
[10] "Climate Change and Waste." EPA

important management strategy for waste is simply to make a huge reduction of the amount of materials that are consumed.

To understand how society traded thrift for convenience and attached value to consumerism, it is necessary to understand the system in which humankind lives. The system in which stuff moves through is known as the materials economy. The model is based on a linear understanding of the process and through this lens it recognizes five main components: **extraction, production, distribution, consumption, and disposal.** This model makes it seem like stuff moves through it easily, it does not account for the constraints that are faced in reality. Every step of the way there are consequences of living the consumer lifestyle, lives and the environment interact with the system every day in different ways, and this conception does not account for those impacts[11]. Put simply, this conventional way of looking at the system has created a huge problem, a "Linear system on a finite planet cannot be run indefinitely".[12]

Consumption is what the success of this system depends on. Value is assigned to individuals' consumption habits; 99% of stuff bought by consumers is disposed of 6 months after they were bought.[13] Consumerism became a foundational aspect of American society after World War 2. At the time, people wanted to continue the war-time economic boom. That is when consumerism and the American economy became interwoven. The economy became dependent on an ever accelerating rate of consumption. The key to its success is creating products to become useless as quickly as possible, leading the consumer to dispose of it, and then replace it with another of the same.[14] Disposable coffee cups are a great example. They have a lifespan of

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[11] *The Story of Stuff*. "*The Story of*"
[12] *The Story of Stuff*. "*The Story of*"
[13] *The Story of Stuff*. "*The Story of*"
[14] *The Story of Stuff*. "*The Story of*"

one-time use. A consumer buys their latte, they drink it, and then they throw it away. The next day, the process repeats again. This is the norm for American society, with almost every product and associated experience. Technology is rapidly improving, but most of the structural components are the same, in computers for example, only the chip is what changes. In each new model, the shape of the chip changes, and that chip is a different shape, which results in it not being able to fit in older models. The consumer is forced to dispose of the old computer and buy a new one. This is called **planned obsolescence**; it has not always been the way of living, and because of that it can be changed. Companies intentionally design their products to last long enough that it is "worth it" for the consumer to invest in, and to ensure they will continue to buy more. **Perceived obsolescence** refers to the consumer disposing of items that are still in perfectly good working condition because they look outdated and perceive an outside pressure to fit-in.[15] The goal of all these strategies is to keep consumers buying new things.

Zero Waste

According to the Zero Waste International Alliance, Zero waste is, "**The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health."** This focuses on reducing and refusing as the primary steps; if those are not applicable, then turn to recycling and composting the remaining material. [16] Waste prevention is the best management option.[17] Most municipalities in the state with Zero Waste Plans are aiming for 70-75% diversion in a 5 year period.[18] In

[15] *The Story of Stuff*. "*The Story of*"
[16] City of Oceanside. Climate Action Plan. The City of Oceanside & Partners. January 2019.
[17] "Climate Change and Waste." EPA
[18] City of Oceanside. Climate Action Plan.

addition, many plans have set goals for 90% zero waste by 2020-2025. [19]

Calculate emissions reduction for Zero Waste (WARM)- EPA

Calculates total greenhouse gas emissions of baseline and alternative waste management practices- source reduction, recycling, combustion, composting, landfilling. Measured in MTCE, MTC02E, & million BTU across types of waste materials.

[EPA WARM most recent version]

Equations for Life-cycle food waste

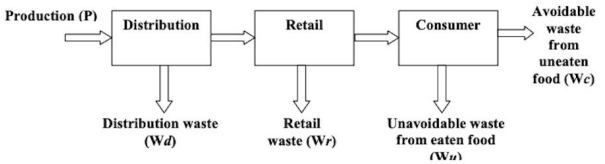

Figure 1. Life-cycle model of material flow from production to disposal

Equation 1 below defines the basic mass balance in the life cycle of a food commodity. The difference between production (P) and consumption (C) is the total gross waste made up of waste at the distribution (Wd), retail (Wr) and consumer (Wcg) levels. All quantities are product weights.

$$P - C = Wd + Wr + Wcg \quad (1)$$

The food availability data series provides values for each of the terms in Equation 1 for all commodities on an annual basis from 1970 through 2009. This is described further in the Food Waste Data section below. Wcg is the gross consumer waste, the sum of avoidable and unavoidable consumer waste:

$$Wcg = Wc + Wu \quad (2)$$

The avoidable consumer waste (Wc) – also referred to as "consumer waste" in this paper – represents uneaten food that is wasted at the consumer level and is defined in Equation 3. Wc excludes the unavoidable waste in consumed foods due to non-edible parts (such as skins and shells) as well as fat or moisture losses in cooking. N is the fraction of a food commodity that is non-edible, and L is the fraction that is lost as fat or moisture during cooking.

$$Wc = Wcg - \left(\frac{1}{(1-N)(1-L)} - 1\right)C \quad (3)$$

The non-edible fraction N for each commodity is obtained directly from the food availability data. The fat or moisture lost in typical cooking is estimated from USDA ERS (1998) based on certain cooking assumptions as shown below. These estimates apply only to meats, fish, eggs and oils, all of which lose fat and possibly moisture during cooking. Vegetables may lose moisture in cooking, but we assume that this is

Circular Economy

"A circular economy is an economic system aimed at minimizing waste and making the most of resources. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling."[20] This type of economy is structured around services instead of goods; the foundational difference is that in this system resources cycle. Imagine, renting out jeans from a retailer, once worn out, you return them they get broken

[19] City of Oceanside. Climate Action Plan.
[20] Lenier, Sage. "The Circular Economy" Lecture 5, Stanley Hall, 2020.https://sites.google.com/berkeley.edu/zerowastedecal/lectures/5-the-circular-economy?authuser=0

down and remanufactured into a new pair that will then get rented out again. Patagonia takes back its products and repairs worn out clothes. FairPhone is a company that is revolutionizing how phones are made, if something breaks down, you can take apart the phone and replace only the broken part. Iphones on the other hand usually entail a total phone replacement when one component is broken.[21]

California Legislation

Implemented Legislation

- ➔ SB 1383 (Lara, Chapter 395, Statutes of 2016) is the most significant waste reduction mandate to be adopted in California in the last 30 years
- ➔ AB 341: 75% Initiative: recycling, composting or source reduction of solid waste by 2020
- ➔ SB 32 & AB 32: reduce to 1990 levels by 2020 ad 40% by 2030
- ➔ 2030 Climate Strategy, CalRecycle: Increase edible food recovery by 20%, reduce total organic waste disposal by 75% by 2025
- ➔ AB 1826: AB 1826: Mandatory Commercial Organics Recycling,

On the legislative agenda:

- ➔ SB 54 & AB 1080: reduce single-use waste, truly recyclable & compostable packaging
- ➔ AB 2002: California Deforestation free procurement Act
- ➔ AB 1163: Right to Repair
- ➔ AB 619: Bring your own food & reusable containers
- ➔ AB 1162: Prevents distribution of SUP toiletries in hotels

[21] Lenier, Sage. "The Circular Economy"

SB 1383

SB1383 is one of the most important waste reduction mandates to be passed in the last 30 years, in California's legislatures. It requires that the state of California reduce organic waste by (food waste, green waste, paper products) disposal by 75% by 2025. Failure to follow this state policy will have some legal implications for local governments. SB1383 requires that local governments provide organic waste collection to all residents and businesses, establish an edible food recovery program, design an outreach program to educate communities and businesses (including haulers, facilities, edible food recovery organizations, and city departments). Planning, inspecting, enforcing, and maintaining records of compliance are other responsibilities expected from each jurisdiction. About 27 million tons of organic waste was disposed of in California in 2017; when this organic waste breaks down in the landfill it creates methane (one of the most potent greenhouse gases, 72 times more potent than C02 over 20 years). In addition, 21% of methane emissions come from organic waste in the landfill. The release of methane to our environment pollutes the air, causing respiratory illnesses in nearby communities. Methane gas has contributed greatly to climate change; diverting organic waste away from the landfill, will reduce the impact of climate change.[22]

Escondido Current Programs

- ➔ **Xeriscaping & Grasscycling:** Quarterly workshops, displays, contest
- ➔ Backyard/ on-site compost/mulching

[22] "SB 1383: Reducing Short-Lived Climate Pollutants in California," CalRecycle. 2020.https://www.calrecycle.ca.gov/organics/slcp/education#:~:text=General%20Information,and%20other%20food%20recovery%20organizations.

- ➔ **Business waste reduction:** Partner w/EDI local business waste audits
- ➔ **School Source Reduction & Recycling**: assemblies to school population, 4th & 5th grade recycling camp, share resources from pilot programs with interested teachers
- ➔ **Government:** source reduction, Government Recycling Programs, Government Composting Program, alkaline battery collection, Dixon Lake Clean-ups, free e-waste & on-site shredding, city christmas tree recycling, We Clean Escondido, Creek to Bay, California Coastal Clean-up
- ➔ **Residential:** Curbside, Drop-Off, Buy-Back, Curbside Greenwaste Collection, Self-Haul Greenwaste (free coupon program)
- ➔ **Commercial:** On-SIte Pick Up, Self-Haul, on-site green waste pick-up, Self-haul Green Waste, Organics Recycling
- ➔ **Material Exchange/ Thrift Shop Promotion:** Goodwill Storefront, Habitat for Humanity Restore
- ➔ **Food Waste Compost:** Goals continued to be assessed?
- ➔ **Sludge:** Tule Ranch Farmland
- ➔ **Tires:** encouraged to take to local tire facilities
- ➔ **White Goods:** Retailers like Home Depot collect old appliances
- ➔ **Scrap Metal**: Some recycling centers still accept
- ➔ **Wood Waste:** chipper ground cover & free for residents
- ➔ **Concrete/Asphalt/Rubble**
- ➔ **Electronic & Print Promotion of programs:** Brochures, EDI newsletter, flyers, news articles

- ➔ **Outreach/Education:** Earth Day Poster Contest, HHW collection event at EDI, HHW brochure & magnets @ community events, city e-newsletter, HHW video at DMV, FB & IG promotion, EDI tours

Product & Landfill Bans: Collect sharps & prescription drugs, reusable bags are sold, reusable bag distribution by the city recycling staff.

Economic Incentives: recycling tipping fees lower than SW fees, lower overall monthly rate, compost reduced/subsidized rate, extra recycling and green bin free of charge

Ordinances: C&D ordinance,commercial organics/recycling, multi-family recycling, residential recycling, waste collection, content procurement, residential green waste, anti-scavenging, green-building

Economic Incentives: recycling tipping fees lower than SW fees, lower overall monthly rate, compost reduced/subsidized rate, extra recycling and green bin free of charge

Escondido State of Waste Management

Escondido produces 50% more waste per capita than the United States overall (which is already the 3rd largest producer of waste per capita.[23] Escondido consistently rises in waste production every year by about 5000 tons, resulting in 1.2 tons per person per year being produced in Escondido as opposed to 0.8 tons for the US and 1 ton for California and San Diego. Some legislation in the past has attempted to address this, however it not only does not go far enough, but the businesses and multifamily residencies that it applies to largely do not comply with the regulations. For example, AB 1826 requires businesses to appropriately dispose of green

[23] Byrnes, Hristina, and Thomas C. Frohlich. "Canada Produces the Most Waste in the World. The US Ranks Third," July 12, 2019. https://www.usatoday.com/story/money/2019/07/12/canada-united-states-worlds-biggest-producers-of-waste/39534923/

waste and food waste, and a 2019 study found that only 13% of businesses comply with the green waste portion and only 1% of businesses comply with the food waste portion. The waste that Escondido produces is hauled by SANCO (whose parent company is EDCO) and Escondido Disposal to landfills in poor communities of color in the Los Angeles area. Since 2014, Escondido has transported waste to one of three landfills: Commerce Refuse-To-Energy Facility (CREF), Covanta Stanislaus, Inc., and Southeast Resource Recovery Facility (SRRF). CREF is located in the Laguna/Rio Hondo neighborhood in Commerce, CA which has a population that is 72.5% Mexican and 3.1% Native American. Covanta Stanislaus inc. and SRRF are located on Terminal Island in Long Beach which does not have as much of a defined residential area as Laguna/Rio Hondo, but of those that do reside on Terminal Island, 25% are black and 30% are hispanic. Escondido produces a disproportionately large amount of waste, and that waste directly negatively impacts communities of color in addition to Escondido residents and the environment.

Environmental Justice Impact of Waste

Human Health Impact from Petrochemicals

Communities of color and low-income communities often live and work near oil refineries and factories that produce petroleum and associated byproducts thus, they are disproportionately impacted by health issues associated with these industries. These industries often release particulates into the air that can be toxic within the factories and also in the neighborhoods around them. Moreover, petroleum is often turned into plastic, which is harmful throughout its entire life cycle.

Members of these communities work very hard under dangerous or hazardous conditions; for their hard labor workers are paid below minimum wage, that is they are paid below a **living**

wage .[24] Furthermore, "...Poverty, pollution, and environmental degradation," are some of the consequences that frontline communities are dealing with in our country, and across the world.[25] In addition, the number of and amount of chemicals that are released into the environment, have resulted in a growing list of associated health issues. One of those chemicals is Bisphenol (BPA); the U.S, produces over 6 billion pounds of BPA annually. BPA is a hormone disrupting chemical, used to form polycarbonate plastic, it is used in the linkage between cans and other containers . Evidence has shown that this chemical causes adverse reproductive outcomes like infertility, cancers, and malformations.[26] The communities most affected by these issues are the Latinx and African-American communities. Due to higher rates of exposure to chemicals like BPA, these communities are experiencing earlier signs of puberty. A few years ago, BPA was replaced by Bisphenol S (BPS) , an alternative just as dangerous as its predecessor. [27]

Chemicals associated with plastic polymers are now found in human blood, urine, and tissue.[28] One recent estimate of the average exposure in Americans from all of the potential sources of plastic exposure clocked in at 70,000 particles per year.[29] Chemicals in plastics have been linked to cancer[4], high cholesterol, reproductive problems, hormone and endocrine disruption, neurological disorders, and immune suppression.[30]

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[24] Lenier, Sage."Environmental Justice."
[25] Lenier , Sage. "Environmental Justice." Sustainable Future DeCal, 2020. https://sites.google.com/berkeley.edu/zerowastedecal/environmental-justice?authuser=0.
[26] Morello-Frosch, Rachel. "Environmental Chemicals and Public Health." Lecture, Hearst Field Annex, 2020.
[27] Morello-Frosch, Rachel. "Environmental Chemicals and Public"
[28] Wright SL and Kelly FJ (2017) Plastic and Human Health: A Micro Issue? *Environmental Science & Technology* 51: 6634–6647. doi: 10.1021/acs.est.7b00423
[29] Cox KD, Covernton GA, Davies HL, *et al.* (2019) Human Consumption of Microplastics. *Environmental Science & Technology* 53: 7068–7074. doi: 10.1021/acs.est.9b01517
[30] (2015) Vinyl Chloride. *National Cancer Institute*. Available: https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/vinyl-chloride. Accessed May 24, 2019; Trasande L, Shaffer RM, Sathyanarayana S and Council on Environmental Health (2018) Food Additives and Child Health. *American Academy of Pediatrics* 142. doi: 10.1542/peds.2018-1410; Nicole W (2013) PFOA and Cancer in a Highly Exposed Community: New Findings from the C8 Science Panel. *Environmental Health Perspectives* 121 doi: 10.1289/ehp.121-A340; Stapleton HM, Klosterhaus S, Keller A, *et al.* (2011) Identification of Flame Retardants

Operation National Sword

China received most of the world's plastic up until 2018, when the government implemented Operation National Sword. Across China, environmental degradation was widespread and Chinese citizens were developing major health problems as a result of handling most of the world's waste.The government was forced to take action and set-up stricter contamination policies, and significantly reduced the amount of material they were accepting. This had huge ramifications globally, and the recycling industry was and is still reeling from its impacts. The truth is, that most of the material that ends up in MRRF's (Multi Resource Recycling Facilities) is contaminated, difficult to recycle, and sometimes not recyclable at all. Wealthy nations collect their recyclables at these facilities, and then ship them overseas where they are bought by waste sorters. As previously stated, most of what is sent over is trash; it has no value and cannot be recycled. Thus, America is sending their immense amount of waste to be essentially landfilled in other countries. Countries like Malaysia do not have the system to deal with the copious amounts of waste western countries are sending over. "Recyclables" are left in trash heaps that release toxins into the environment via soil or water, creating pollution. On many occasions, people live right next to these ever-growing waste heaps. Recycling in reality was a way for the fossil fuel industry to continue to meet their bottom line when pressured with the reality of the climate crisis in the 20th century. In sum, plastics recycling is not the answer and has simply reduced the amount of time left to mitigate its repercussions.

Food Justice

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in Polyurethane Foam Collected from Baby Products. *Environmental Science & Technology* 45: 5323–5331. doi: 10.1021/es2007462

Definition & History

According to the LA Garden Council Food Justice is, " Access to fresh, locally grown, and culturally appropriate food, living wages and fair working conditions for all food system workers, community control over food systems, through community-based agriculture, co-ops, faith-based initiatives, etc."[31] Food justice is integral to the fight for social justice, thus integral to the fight for climate justice, and justice is a pillar that every American strives to uphold. Food Justice is the acknowledgement that food is a right.[32] Patricia Allen the Director of the Center for Agroecology and Sustainable Food Systems at the University of California at Santa Cruz stated, "It is clear that our food system does not meet the fundamental criteria of social justice such as freedom from want, freedom from oppression, and access to equal opportunity."[33] Moreover, "The production of food in the United States includes a history of oppression, dating from the plantation economy of the South to the expansion and settlement of the West reliant on subsequent waves of Chinese, Japanese, and Latinx immigrant agricultural labor". [34] Over the past few decades, the food system has become increasingly globalized and unequal, it has come to be controlled by a few corporations.[35] Agriculture and food corporations are dependent on exploited labor and environmental degradation for their profits.[36] This current system is completely unsustainable, exploitative, and it has a tremendous CO2 footprint, intensifying

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[31] Campos, Diana. "Food Justice: What It Means and Why It Matters." Los Angeles Community Garden Council, November 21, 2019. http://lagardencouncil.org/food-justice-what-it-means-and-why-it-matters/.
[32] Alkon, Alison Hope, and Julian Agyeman. *Cultivating Food Justice: Race, Class, and Sustainability*. Cambridge, MA: MIT Press, 2011.
[33] Sbicca, Joshua. *Food Justice Now!: Deepening the Roots of Social Struggle*. Minneapolis, MN: University of Minnesota Press, 2018.
[34] Sbicca, *Food Justice Now!*
[35] Barhoum, Nadia. "Food Justice and Community Health in Richmond: Campus-Community Partnerships to Create a More Healthy and Equitable Food System" Berkeley, CA: Haas Institute for a Fair and Inclusive Society, University of California, Berkeley, 2016
[36] Sbicca, *Food Justice Now!*

climate change.[37]

Food Insecurity & Waste

Currently, 815 million people are hungry; the world grows enough food to feed 10 billion people. There is not a problem of food scarcity, cycles of poverty and inequality are the root cause. In addition, ⅓ of all food produced globally is wasted; in the U.S. 52% of food is wasted. Large amounts of food are lost due to the overemphasizing of appearance; 40% of loss happens at retail and consumer levels.[38] Furthermore, Americans waste so much food, a 90,000 seat football stadium could be packed to the top. [39] This is untouched food that goes to the landfill. In 2016, ⅛ of Americans were food insecure.[40] The communities hardest hit by food insecurities are communities of color; communities of color are disproportionately affected, in 2016, 26.1% of black households and 22.4% of latinx households were food insecure.[41]

A food desert is a phenomena that occurs in low-income households where there is difficulty obtaining nutritious foods because of limited or non-existent local supplies of such food. [42] For example, in lower income communities there might be two liquor stores on the same block, but the nearest Trader Joe's is a 30 minute drive. This is an injustice. Black and Latinx communities are more likely to suffer from diet-related diseases. [43] Furthermore, "...access to the highest-quality food remains stratified along class, gender, and racial lines."[44] Native food systems have been decimated; the loss of cultural cuisines have stemmed from the displacement

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[37] Barhoum,"Food Justice and Community Health"
[38] Lenier, Sage. "Food Justice" Lecture 7, Stanley Hall, 2020.https://sites.google.com/berkeley.edu/zerowastedecal/lectures/7-food-politics?authuser=0
[39] "Hunger Is the Worlds Dumbest Problem ." Copia, n.d. https://www.gocopia.com/problem.
[40] Lenier, Sage. "Food Justice"
[41] Barhoum. "Food Justice and Community Health"
[42] Mercier, Stephanie. "What Are Food Deserts, and Why Do They Matter?" AG Web , May 14, 2020. https://www.agweb.com/blog/what-are-food-deserts-and-why-do-they-matter.
[43] Barhoum, "Food Justice and Community Health"
[44] Sbicca, *Food Justice Now!*

they have endured. It must be acknowledged that food is also about culture.[45]

Emissions

Emissions from food mainly occur in the transportation of and the decomposition when it ends up in the landfill. Food waste contributes to greenhouse gas emissions through its decomposition process in the landfill and through its production, processing, transport, and retailing. Most emissions are due to the latter. In the United States, food waste accounts for 113 million metric tonnes of CO2e annually.[46] The industrialized food system in the U.S. has had dire consequences on the environment it, "perpetrated peak oil, peak phosphorus, virtual water, pesticide toxicity, dead zones, genetically modified organisms, biofuels, and global warming." [47] For example, "Pesticide dependency leads to the contamination of fresh water supplies, the death of domestic animals, degradation of fisheries, and collapse of vital bee colonies, which grows worse as pests become more resistant and necessitate greater pesticide application."[48] According to a United Nations Report, the global food system accounts for 37% of all greenhouse gas emissions. Furthermore in that same report land-use practices like agriculture account for 23% of human greenhouse gas emissions.[49] If food waste was reduced to zero, 11% of greenhouse gas emissions could be eliminated.[50] Food waste is a substantial contributor to food-related greenhouse gas emissions. Serving more plant-based foods and smaller portions of meat and

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[45] Alkon, Hope, and Agyeman. *Cultivating Food Justice*

[46] Venkat, Kumar. "The Climate Change and Economic Impacts of Food Waste in the United States." *Journal on Food System Dynamics*, April 2012, 431–46. http://centmapress.ilb.uni-bonn.de/ojs/index.php/fsd/article/view/247/182.

[47] Sbicca, *Food Justice Now!*

[48] Sbicca, *Food Justice Now!*

[49] McFall-Johnsen, Morgan. "Our Food System Accounts for a Whopping 37% of Greenhouse-Gas Emissions, a UN Report Found. But It Could Also Offer a Solution to the Climate Crisis." Business Insider. Business Insider, August 8, 2019. https://www.businessinsider.com/food-system-role-in-climate-crisis-possible-solutions-2019-8.

[50] Spiegel, Jan Ellen. "Food Waste Has Crucial Climate Impacts " Yale Climate Connections." Yale Climate Connections, October 8, 2019. https://www.yaleclimateconnections.org/2019/05/food-waste-has-crucial-climate-impacts/.

dairy will help cut waste from animal products, which account for an outsized portion of total emissions associated with food waste.

Meat consumption has been increasing over the past decades; the U.S. is notorious for its meat consumption.[51] The amount of meat consumed per person has doubled over the past 50 years.[52] While the links between diet and GHG emissions are not yet widely acknowledged, the issue is well-known and the science is clear—**the climate impact of animal agriculture is a significant generator of carbon emissions.** The production of meat and dairy generally has much higher greenhouse gas emissions than plant-based foods. The deforestation associated with opening up more space to raise livestock results in emissions. Natural biological processes like belching and flatulence result in the emission of methane from cows. Methane is one of the most potent greenhouse gases, it is 25 times-100 times more destructive than CO2 over a 20 year period. Cows alone are responsible for 150 billion gallons of methane per day. Moreover the transportation of the product also produces additional emissions. In total, Animal agriculture is responsible for 18% of greenhouse gas emissions. What is even more troubling is the amounts of emissions from this industry are projected to increase by 80% by 2050.[53] Water resources are at risk in our warming world hit by increasingly frequent and catastrophic natural disasters. Meat and dairy production has a harmful impact on water quality and uses substantially more water resources than plant-based foods.

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[51] Ritchie, Hannah. "Which Countries Eat the Most Meat?" BBC News. BBC, February 4, 2019. https://www.bbc.com/news/health-47057341.

[52] Devlin, Hannah. "Rising Global Meat Consumption 'Will Devastate Environment'." The Guardian. Guardian News and Media, July 19, 2018. https://www.theguardian.com/environment/2018/jul/19/rising-global-meat-consumption-will-devastate-environment .

[53] "The Sustainability Secret." COWSPIRACY. Accessed June 27, 2020. https://www.cowspiracy.com/infographic.

Food Hub

A food hub is a "business or organization that actively manages the aggregation, distribution, and marketing of course-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand." Food hubs help create new jobs and also address food insecurity by focusing on expanding food reach into underserved communities. They work towards creating new markets for regional and local producers. They help build community through actively taking steps to partner with food banks, increasing awareness around buying local, offering farm tours and apprenticeship opportunities, helping feed underserved communities, and redeeming SNAP benefits. In addition, food hubs also reduce energy and waste in the distribution area. There are many funding opportunities that are available for different stages of implementation from federal and non-federal sources. This system always has sustainability at heart, many food hubs highly encourage or require that the growers and ranchers they partner with, employ sustainable agricultural practices and, work on implementing sustainable production practices. A survey in 2011 conducted by The NFHC showed that " Half the food hubs have recycling programs, 44 percent have composting programs, and 22 percent have energy-saving programs."[54]

Food Cooperative

A food cooperative is a business that is owned by workers or customers, members have the ability to choose what food and products are available. They provide high-quality foods at

[54] Barham, James, Debra Tropp, Kathleen Enterline, Jeff Farbman, John Fisk, and Stacia Kiraly. Regional Food Hub Resource Guide. U.S. Dept. of Agriculture, Agricultural Marketing Service. Washington, DC. April 2012.

fair prices, support local growers, help create jobs, and offer bulk sections. [55] Bulk sections are especially important to reducing the amount of single use plastic waste in circulation.

Food Justice Measures & Actions

1. Create locally grounded food cooperative
2. Create a food hub
3. Relocalize Escondido Food System
4. We strongly urge the climate planners to review and pursue the recommendations contained in the report ***MEAT OF THE MATTER: A Municipal Guide to Climate-Friendly Food Purchasing***, adapted for Escondido.
5. CAP should create a staffed working group to evaluate resources and develop a plan to increase food security, reduce climate emissions, and improve health for the city and environment.
6. The City should provide pathways for institutional procurement of local produce that would facilitate investment in local farms and offer farm microloans, tax-incentives, and grants. These should be restricted to produce farming since animal agriculture does not support emissions reductions.
7. The CAP should include requirements or incentives for institutional adoption of a minimum number of fully plant-based meals at government meetings, hospitals, schools, universities etc.. The city could build upon Palomar Hospital's commitment to Meatless Mondays and vegetarian options in its cafeteria.

[55] Sutter, Kristin. "Are You Missing Out on Your Local Food Co-Op?" Taste of Home, August 14, 2018. https://www.tasteofhome.com/article/food-co-ops/.

8. The City should encourage and fully support the local Farmer's Markets in the region to promote more consumption of locally grown foods which have the lowest carbon footprint.
9. The City should support or jointly initiate a climate and public health campaign to encourage more plant-based, whole foods eating in the region. This type of public health campaign has already been demonstrated to work through anti-smoking campaigns, and may result in savings based solely on the public health burden reduction.
10. The CAP should include commitment to educational materials, workshops on plant based eating, and promotional events to encourage more plant-based eating.
11. The city should develop an education program for 'climate-friendly living' to encourage and educate residents about all the ways to reduce personal and family level GHG emissions and include promotion of plant-based diets including a widespread commitment to Meatless Monday.
12. The CAP should include a sector analysis and measures to promote plant-based diets. Just like establishing goals for bike and transit commuting, it should quantify goals for the population to eat a plant-based diet. Even a reduction of 50% meat consumption by a portion of the population would yield significant results.
13. Climate-friendly menus (plant-based) should be served at all City and city sponsored events with educational materials to accompany them.
14. The City should partner with groups like Physicians for Responsible Medicine and evaluate and share materials such as Every Meal Power Plate. [56]

[56] http://www.pcrm.org/sites/default/files/images/health/pplate/EveryMealPowerPlate.pdf

15. The CAP should include measures to create an *Eat a Climate-Friendly Diet* working group and partner with local vegan and plant-based groups, farmers, business and spiritual traditions that already eat a plant-based diet and have expertise to share.
16. The CAP should include measures to offer tax-incentives to restaurants where 50% or more of the menu offerings are plant based.
17. The CAP should include measures to fully preserve and increase suitable agriculture reserve lands suitable for produce farming and create urban agricultural zones to put vacant parcels into produce food production in urban areas.
18. The City should partner with organizations that support produce farmers and help them sell locally. Groups like San Diego Food System Alliance, California Food Link, and the San Diego New Farmers Guild would be good partners.
19. The CAP could investigate programs to incentivize the food technology industry to develop plant-based and cellular agriculture alternatives to animal products.

Conclusion

It is imperative that the E-CAP recommendations partner with community organizations that work towards food justice and create programs that champion food justice. Individuals in Escondido lack access to healthy food, and it is important that these policies are initiatives that benefit communities of color and low-income communities directly. As part of the legislation, there should be a commitment to defending the food practices (local, slow, and deep) of marginalized communities in Escondido, and a recognition of the history of the land upon which this jurisdiction sits upon, benefits from, and should strive to partner with the The Rincon Band

of Luseño Indians & The San Pasqual Band of Mission Indians. The city must help lead a paradigm shift in the community from viewing food as a nutritional commodity to ".... that which encompasses a set of deep social and cultural relationships that foster community, cultural, and place-based identities."[57] Escondido should lead in creating programs and spaces in the community like locally grounded food cooperative unions, creation of a food hub, increasing accessibility to food by acknowledging food is a right (direct partnership with food banks and other food justice organizations), relocalizing food systems through increased partnership with local farmers and, creating more opportunities for education around food and food waste. This must be done to center climate justice in the E-CAP.

Plastic

The Problem

Plastic is a growing threat to our future, and it is tied intimately with fossil fuel extraction at the beginning of its life cycle, and with overwhelming impact on the world ocean at the end of its life cycle. Before 2018, much of the recycling from the U.S., EU and elsewhere was being shipped to Asia.[58] In 2018, China implemented a new policy called "National Sword" that banned the import of plastic waste. Many countries responded by sending waste to other Asian nations, like the Philippines, Thailand and Malaysia. Now, some of those countries are shutting their ports to it, and even sending some of it back.

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[57] Alkon, Hope, and Agyeman. *Cultivating Food Justice*

[58] *Brooks AL, Wang S and Jambeck JR (2018) The Chinese import ban and its impact on global plastic waste trade. Science Advances. 4. doi: 10.1126/sciadv.aat0131*

The importance of reducing plastic waste has become imperative as we do not have the infrastructure in the United States to deal with plastic waste. Deforestation for petrochemical extraction and infrastructure, the process of natural gas fracking, transportation in plastic production and supply, refining and manufacturing, landfill decomposition, incineration, and even recycling have associated emissions that cause a significant contribution to climate change.

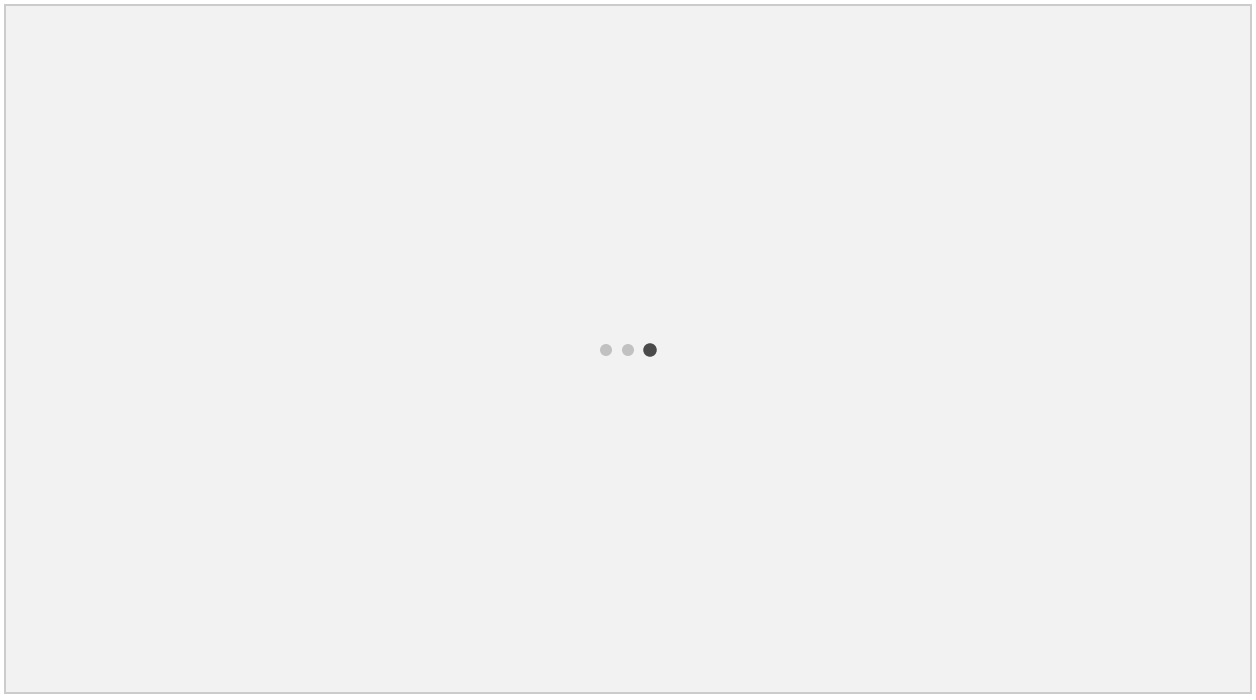
At the end of the life cycle of plastic described above, plastics are impacting the marine environment, which is not only a source of food, recreation, and tourism for our coastal economy, but also a biological buffer for carbon dioxide. According to NASA, approximately one quarter of all carbon dioxide is absorbed by the world's oceans, sequestered into primary producers like algae, and incorporated into the ocean's web of life.

The ability of the ocean to absorb carbon dioxide depends on balanced ecosystems, all of which are now impacted by plastic pollution. **An estimated 17.6 billion pounds of plastic enters the marine environment every year — roughly equivalent to dumping a garbage truck full of plastic into the oceans every minute.** Models for making estimates of impacts to the ability of the ocean to sequester carbon are still being formulated and tested by several scholarly institutions. In 2017, the most recent year recorded by the University of San Diego, Escondido ranked 4th highest in San Diego County for waste per capita at 6.2 lbs per capita per day.

Opportunity/ Solution

In addition to GHG savings, Escondido can save taxpayers money and eliminate an annual drain on city finances that are usually spent on waste mitigation measures.[59] Eliminating non- recyclable plastic waste from the waste stream will also allow for more efficient sorting of recyclable materials, in turn assisting with waste diversion and decreasing operating costs for waste management.

Eliminating unnecessary single use plastic products such as plastic and styrofoam plates, bowls and cups, and plastic utensils and stirrers, can also save businesses money. The same is true for implementing a straws on request policy. A fraction of the money spent on buying these materials can be spent on implementing dishwashing systems and creating more jobs for Escondido.



[59] Monroe, leila. "Waste in Our Waterways: Unveiling the Hidden Costs to Californians of Litter Clean-Up." NRDC, August 2013. https://www.nrdc.org/sites/default/files/ca-pollution-in-waterways-IB.pdf.

Lastly, in order to supplement food waste in an effective composting system, materials rich in carbon are needed. Replacement of plastic take- out containers with truly compostable material means more carbon for soil replenishment and compost. In other words, a system of food waste diversion will work more effectively when combined with compostable carbon-based materials such as those used in many compostable take- out containers

Greenhouse Gas Savings Estimates

Estimates of GHG savings from plastic waste reduction are very difficult to quantify and have a range of estimates from scholarly sources. The climate impact of plastics is undoubtedly significant, especially considering the full life cycle of plastics from extraction to the landfill or ocean. An attempt is made below to provide a framework for a formula to quantify GHG savings from reducing plastics.

$G_T = R((G_P \times E_P) + (G_O \times (½\ E_W/7.98\ \text{Million MT}))$

Key

G_T - Annual GHG Savings measured in MTCO2eq by eliminating X% of plastic waste

R = Percentage reduction from 2019 plastic waste

G_P – Factor of atmospheric carbon emissions per MT of plastic used (including extraction, deforestation, transportation, processing, incineration, and landfill and ocean surface emissions)

E_P = Total metric tons of plastic recycled in Escondido/ year = Information needed from EDCO

G_O - (Impact on the ocean's ability to absorb CO2 per MT of plastic waste)

E_W = Total metric tons of plastic not recycled directly in Escondido, with an estimated 50% of plastic making it to the ocean eventually

T_W - Total waste entering the ocean from land- based sources annually = 7.98 Million Metric Tons

- The ocean's ability to absorb plastic = (⅓ of all CO2)
    - Assuming: plastic waste at the current rate will completely remove the ocean's ability to absorb CO2
    - Assuming ⅓ of all CO2 is absorbed by the ocean
    - Escondido's impact on this = (⅓ of all CO2) x (½ E_W/T_W)

Examples of other municipalities

The City of Oceanside's Climate Action Plan contains an initiative for Extended Producer Responsibility and a recyclable or reusable percentage mandate. A piece of proposed national policy that sets the framework for meaningful plastics reduction is The Break Free From Plastic Pollution Act of 2020. Any local ordinance based on this standard would accomplish meaningful plastics reduction. Escondido could become a leader in incorporating a plastic reduction policy recommendation into the Climate Action Plan, and as such, would reap additional benefits in GHG savings, taking into account the total percentage reduction in plastic waste generation and the full life cycle emissions of plastic waste.

Case Studies

Oceanside

Overview

- ➔ Set goal for 75% landfill diversion by this year (2020)
- ➔ Organics were about half of the material landfilled in 2010
- ➔ Zero waste plan focuses heavily on community outreach and education
  - ◆ Calculate that 4,000 tonnes of diversion can be accomplished by improvements in these areas
- ➔ Expanded residential and composting program could capture another 13,000 tonnes annually
- ➔ Created an opportunity to increase jobs
- ➔ Food donations and home composting expansion would reduce the cost of implementing composting programs

Timeline

Year 1:

- ➔ Support and expand school composting, commercial on site composting, and home composting programs
- ➔ Support and expand reuse opportunities
- ➔ Waste generation characterization study to provide a solid baseline for measuring progress on ZW goals

Years 2-5:

- ➔ Adopt plastic bag reduction ordinance
- ➔ develop program for business and institution waste reduction services
- ➔ recycling containers where every trash receptacle is
- ➔ environmentally preferable purchasing program

Phase 2:

- ➔ Take back policies
- ➔ Evaluate progress towards ZW goals

Encinitas

Solid Waste accounted for 5% of total GHG emissions in 2012

- ➔ City has jurisdiction over handling of solid waste generated by the community
- ➔ Reduction in city emissions by 2,830 MTCO2e by 2020
- ➔ Reduction in city emissions by 11, 921 MTCO2e by 2030
- ➔ Divert 65% by 2020
- ➔ Divert 80% by 2030
- ➔ Divert 90% of waste from landfills by 2035 & capture 85% of GHG emissions
- ➔ Implement organic waste recycling program
  - ◆ Support regional efforts to develop residential and commercial food scrap composting programs

- Community appropriate compost facilities in the city
- Support at home-management of food waste: workshops, susbsidies, and worm bins
- Continue Zero Waste Schools program
- Free waste audits to restaurants and grocery stores
- City hall waste audit
- Education program for textile recycling
- Support stewardship and producer responsibility initiatives

Alameda County

Policy and Programs: Alameda City

- Social Marketing campaign
- advocate for producer responsibility
- Increase commercial technical assistance
- Support product bans
- Support disposal bans
- Consider mandatory source separation requirements
- City Government green team
- Work with school district to implement zero waste initiatives
  - Alameda green schools challenge
  - school education and outreach

Ordinances Policies & Fees

- Measure D
  - Reduce waste by 75% by 2010
- Reusable Bag Ordinance
- Mandatory Recycling Ordinance
- Plant Debris Landfill Ban
- Facility Fee
- Household Hazardous waste fee
- Benchmark Service

Recommendations for Escondido E-CAP Solid Waste Management

City Staff Proposed Timeline

Target Year	Performance Metric	GHG Reduction Potential ($MTCO_2e$)
2021	Adopt and implement an organic waste recycling program	-
2023	Adopt a composting and waste diversion ordinance	-
2030	Achieve 80 percent citywide waste diversion in 2030.	23,588
2035	Achieve 85 percent citywide waste diversion in 2035.	25,535

Recommended Timeline

Summer 2020	**Establish a Zero Waste Work Group** as part of the Climate Commission.
Summer 2020	**Prioritize Education and Outreach** as implementation measures for binding city ordinances.
Fall 2020	**Pass a Zero Waste Resolution** with articulated goals for 75% diversion by 2022 and 90% diversion by 2027. (Increase diversion by 15% annually.)
Winter/Spring 2020-21	**Pass single-use plastics reduction ordinance** and polystyrene ban with phased implementation beginning in 2021
January 2021	**Develop a Zero Waste Plan** that prioritizes eliminating food waste and includes a phased approach to reducing single-use plastics.
January 2021	**Begin phased implementation of single-use plastics reduction ordinance** and polystyrene ban
January 2022	**Zero Waste Schools** partnership with district begins
January 2022	**Full implementation of SB 1383:** Universal Composting and Green Waste
January 2022	**Provide infrastructure** to support curbside composting for all households and businesses & build compost infrastructure to process anaerobic digester waste.

Initiative Support Programs

Conduct a waste generation/characterization study immediately

- Identify the amount of materials wasted, reused, recycled, and composted annually
- Identify where wasting occurs
- Commodities analysis

City Hall

- ➔ **Adopt a zero waste business model for city offices & Prioritize zero waste goals**
  - Institute a green purchasing policy
  - Eliminate SUP Water bottles, switch to reusable service-ware, & install water refill stations
  - Adopt a minimum number of fully plant-based meals
  - Climate-friendly menus (plant-based) served at all city and city sponsored events accompanied by educational materials
- ➔ **Establish City department Green Teams**
  - Offer training and support for all staff
- ➔ **Conduct pre/post waste audits at all City facilities**
- ➔ **Set up waste reduction infrastructure & signage**
- ➔ **Create a staffed working group to evaluate the resources and develop a plan to:**
  - increase food security
  - reduce climate emissions
  - improve health for the city and environment.
- ➔ **Provide Pathways for institutional procurement of local produce (restricted to produce farming)**
  - Investment in local farms
  - Offer farm microloans
  - Tax-incentives & grants
  - Encourage and fully support the local Farmers Market
- ➔ **Support or jointly initiate public health campaign to encourage more plant-based whole foods eating**
- ➔ **Create education program for "Climate-Friendly Living"**
  - Encourage and educate residents on ways to reduce personal and family level GHG emissions
  - Host workshops and promotional events on plant-based eating
- ➔ **CAP should include:**
  - Sector analysis and measures to promote plant-based diets
  - Measures to create an "Eat a Climate-Friendly Diet" working group
  - Measures to offer tax incentives to restaurants where 50% or more of menu

offerings are plant-based
- Measures to fully preserve and increase suitable agricultural reserve lands for produce farming
- Create urban agricultural zones to put vacant parcels to into produce food production in urban areas
- Investigate programs to incentivize food technology industry to develop plant-based and cellular alternatives to animal products

Community Programs

- **Partner with community organizations to develop workshops on topics, including:**
  - Environmental impacts of single-use plastics and food waste
  - plant-based diet
  - How to switch to reusables, Use Leftovers, Waste Sorting education
- **Utilize Escondido's community gardens for education outreach on topics, including:**
  - Composting , organic gardening, soil enrichment,
  - Decentralized composting options: backyard and community-scale composting
- **Create a Sustainability Community Resource Center & Creation of a Reuse Warehouse/collaborative**
- **City-wide community engagement campaign: Website, Social Media, & Community outreach**
- **Localize food system & Shorten Supply Chain**
  - Food hub
  - Accepting EBT/SNAP at Farmers Markets
  - Locally grounded food cooperative
  - Partner with food justice community orgs, The Rincon Band of Luseño Indians, & The San Pasqual Band of Mission Indians
- **Develop educational effort around eating a plant-based diet once a week or more and tracking carbon emissions avoided**

Businesses

- **Establish a Green Business program & Develop Guide**
  - pre/post waste audits- allows for better right-sizing
  - Phased, finish up current supplies
  - Offer training and support for both management and staff
  - develop a green purchasing policy
  - reduction procedures/protocols- switch to reusables, disposals only on request
  - EDCO recycle at work program
- **Provide resources/materials, such as**
    - waste/recycling bins
    - signage
    - educational materials
    - composting infrastructure

- incentives/awards/recognition
- waivers & grants
- pop-up events

➔ **Support the switch to reusable/recyclable service-ware**

Schools

➔ **Establish Zero Waste Schools Program**
- Dedicate resources (time and people) to program
- Coordinate Green Team Youth Programs, allocate Funds to support activities, and incentivize participation
- Adopt a minimum number of fully plant-based meals
- Switch to reusable service-ware
- Conduct pre/post waste audits
- Offer training and support for staff, students, and families
- Responsibility and stewardship towards the environment, Environmental Justic
- Diploma seal or Awards
- School gardens

➔ **Provide resources/materials, such as...**
- sorting equipment, waste/recycling bins & signage
- share tables
- educational materials

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