BUILDING FOOD AND NUTRITION SECURITY AND SOVEREIGNTY

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SUMMARY

Development impacts many aspects of the food system, including where food is grown, how far food must travel, where distributors and retailers are placed, and who has access to fresh and nutritious food. By viewing development and its associated impacts through a sustainability and life-cycle lens, we can rethink the role of development and how communities can grow while fostering a strong, inclusive, affordable, accessible, and healthy food system. This Article focuses on the way local governments regulate development and how that impacts the food system. It is excerpted from *Remarkable Cities and the Security and Sovereignty of Food and Nutrition* (ELI Press 2023).

Development is not sustainable if it fails to create and support food- and nutrition-secure and self-supporting neighborhoods. Development impacts many aspects of the food system, including where food is grown, how far food must travel before it is consumed, where distributors and retailers of food are placed, and who has access to fresh and nutritious food. By viewing development and its associated impacts through a sustainability and life-cycle lens, we can rethink the role of development and how communities can grow while fostering a strong, inclusive, affordable, accessible, and healthy food system. Instead of being a force that exacerbates inequalities in access to nutritious food, increases greenhouse gas emissions, and damages wildlife habitats, development can be reconceptualized as a positive force to help regenerate and expand a local sustainable food system.

This Article seeks to jumpstart a move toward healthier, more equitable, and more environmentally friendly communities. It does so by focusing on the way local governments regulate development and how that impacts the food system. While the food system is heavily affected by many international, national, and state policies, local laws regulating development have a significant impact on the food system. And yet, they remain some of the least explored laws.

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Food and nutrition security and sovereignty are essential parts of making communities more equitable. "Food and nutrition security" has been defined in a variety of ways, including existing "when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life."[1] An individual is considered to be food secure when she does not live in either hunger or fear of hunger.[2]

The U.S. Food Sovereignty Alliance defines "food sovereignty" as:

> [T]he right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts the aspirations and needs of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations.[3]

1. Marzella Wüstefeld, United Nations System Standing Committee on Nutrition, Presentation at Meeting of the Minds on Nutrition Impact of Food Systems: Food and Nutrition Security (Mar. 25-28, 2013), https://www.unscn.org/files/Annual_Sessions/UNSCN_Meetings_2013/Wustefeld_Final_MoM_FNS_concept.pdf; *see also* U.S. Agency for International Development, *Agriculture and Food Security*, https://www.usaid.gov/what-we-do/agriculture-and-food-security (last visited July 8, 2021) (defining "food security" as having, at all times, physical and economic access to sufficient food to meet dietary needs for a productive and healthy life).
2. U.S. Agency for International Development, *supra* note 1.
3. U.S. Food Sovereignty Alliance, *Food Sovereignty*, http://usfoodsovereignty-alliance.org/what-is-food-sovereignty/ (last visited Oct. 27, 2021) (quoting Declaration of Nyéléni, the first global forum on food sovereignty, Mali,

As many communities will experience development, growth, and/or changes in the next couple of decades, revising development codes to increase food and nutrition security and sovereignty is particularly important. By some estimates, the U.S. population is projected to increase by almost 70 million people by 2040.[4] While some jurisdictions may experience a decrease in population, the overall increase in U.S. population and the phasing out of older buildings will require massive amounts of development, including approximately 100 billion additional square feet of commercial, retail, and industrial space.[5] In addition, it will require nearly one-half of all residential housing to be new—about 60 million new residential units.[6] Further, studies have suggested that 1 in 12 Americans in the southern half of the country will move toward California, the Mountain West, or the Northwest over the next 45 years because of climate influences alone.[7]

If development patterns for the next 20-30 years replicate development patterns for the last 20-30 years, accommodating these changes and growth will result in the loss of 40 million undeveloped acres in the United States (approximately the size of Oklahoma) and significant losses of agricultural land and critical habitats.[8] In addition, development built according to existing zoning codes will continue or exacerbate race- and class-based inequities, vulnerabilities to climate-changing conditions, and loss of biodiversity, ecosystems, and natural resources. Some of the critical ecosystems and associated services lost through development include purifying water, pollinating food, mitigating flood, controlling disease, and maintaining a resilient nutrient cycle.[9]

Most relevant here, developing pursuant to existing codes fails to adequately build food and nutrition secure communities and address past discriminatory practices concerning the food system and development. The current regulation of development contributes to many challenges, including hunger, malnutrition, obesity, food insecurity, physical and psychological health impacts, environmental impacts, and economic impacts. In addition, some of these challenges more heavily burden Black, Indigenous, and People of Color (BIPOC) and exacerbate systematic inequities.

As greenfields and farmlands are lost to accommodate growth,[10] it is more important than ever that we rethink the way we regulate development. The United States lost more than 31 million acres of farmland to development from 1992 to 2012.[11] This included almost 11 million acres of land where food can be grown with the least environmental impact.[12] Today, almost 2,000 acres of agricultural land are converted every day to other uses.[13]

Not only must we slow the rate of conversion, but we also need to think about regenerating the food system in urban, suburban, and rural areas. Development code amendments should go beyond doing "no additional harm." They should seek to remedy past inequalities and bring back many of the lost ecosystems that are part of a robust food and agriculture system. If lost beneficial aspects of the food system are not regenerated and continue to develop under existing codes, it will exacerbate the strain on an already vulnerable food system.

I. Social Impact on the Food System

Below, I briefly describe some of the ways development affects the food system and how those, in turn, translate into societal harms.

A. *Health Impacts and Food Swamps*

A food swamp is an area "in which large numbers of unhealthy energy-dense food offerings inundate or 'swamp out' the relatively few existing healthy food offerings."[14] In *Adults With Diabetes Residing in "Food Swamps" Have Higher Hospitalization Rates*, Aryn Phillips and Hector Rodriguez found that food swamps are associated with higher hospitalization rates among adults with diabetes.[15] The presence of a food swamp has been found to be a stronger predictor of higher obesity rates.[16]

Getting the proper nutrition in food swamps is particularly challenging. Nearly one-third of the U.S. population over nine years old is at risk of anemia or deficiency in at

2007); *see also* Peter Rosset, *Food Sovereignty: Global Rallying Cry of Farmer Movements*, 9 Backgrounder 1 (2003) (explaining the importance and definition of food sovereignty).

4. Sandra L. Colby & Jennifer M. Ortman, U.S. Census Bureau, Projections of the Size and Composition of the U.S. Population: 2014 to 2060 (2015), https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf.
5. Jonathan Rosenbloom, *Outsourced Emissions: Why Local Governments Should Track and Measure Consumption-Based Greenhouse Gases*, 92 U. Colo. L. Rev. 451, 496 (2021) (citing Arthur Nelson, Planner's Estimating Guide: Projecting Land-Use and Facility Needs 1-2 (2018)); Jennifer M. Ortman & Christine E. Guarneri, U.S. Census Bureau, United States Population Projections: 2000 to 2050, at 16, tbl.1 (2009), https://www.census.gov/content/dam/Census/library/working-papers/2009/demo/us-pop-proj-2000-2050/analytical-document09.pdf.
6. Rosenbloom, *supra* note 5.
7. Qin Fan et al., *Climate Change, Migration, and Regional Economic Impacts in the United States*, 5 J. Ass'n Env't & Res. Economists 643 (2018), https://www.journals.uchicago.edu/doi/full/10.1086/697168.
8. *Id.*
9. Zinta Zommers et al., *Loss and Damage to Ecosystem Services* (UNU-EHS, Working Paper No. 2, 2014), https://i.unu.edu/media/ehs.unu.edu/news/3890/resilience_academy_wp2.pdf.
10. Adam Wernick, *US Lost 11 Million Acres of Farmland to Development in Past 2 Decades,* World (Aug. 7, 2020), https://www.pri.org/stories/2020-08-07/us-lost-11-million-acres-farmland-development-past-2-decades.
11. A. Ann Sorensen et al., American Farmland Trust, Farms Under Threat: The State of America's Farmland (2020), https://farmlandinfo.org/publications/farms-under-threat-the-state-of-americas-farmland/.
12. *Id.*
13. *Id.*
14. Donald Rose et al., Deserts in New Orleans? Illustrations of Urban Food Access and Implications for Policy (2009), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.189.2333&rep=rep1&type=pdf.
15. Aryn Z. Phillips & Hector P. Rodriguez, *Adults With Diabetes Residing in "Food Swamps" Have Higher Hospitalization Rates*, 54 Health Serv. Rsch. 217 (2019), https://perma.cc/56H9-VENQ.
16. Kristen Cooksey-Stowers et al., *Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States*, 14 Int'l J. Env't Rsch. & Pub. Health art. 1366 (2017), https://perma.cc/7NPR-RKJB.

least one vitamin.[17] Anemia is a condition in which an individual lacks enough healthy red blood cells to carry adequate oxygen to the body tissues and is often caused by a shortage of iron in the body.[18] Thirty-one percent of the U.S. population is at risk of at least one vitamin deficiency or anemia.[19]

Food swamps disproportionately impact BIPOC and people with low income and wealth. Studies have shown that Black residents are more likely to reside in food challenged areas, increasing their risk of a poor diet and diet-related health challenges.[20] In addition, 37% of women, 55% of non-Hispanic Black individuals, 40% of individuals from low-income households, 42% of individuals without a high school diploma, 42% of underweight individuals, and 39% of obese individuals are at risk of deficiency or anemia.[21] People wrestling with obesity also have higher than average rates of micronutrient deficiencies.[22] Studies suggest that deficiencies of specific vitamins and minerals (that play important roles in glucose metabolism and insulin-signaling pathways) may contribute to the development of diabetes in the obese population.[23]

By manipulating permissible uses and incentivizing other uses, development codes play a role in creating and maintaining food swamps. In *Disentangling Neighborhood Contextual Associations with Child Body Mass Index, Diet, and Physical Activity: The Role of Built, Socioeconomic, and Social Environments,* Amy Carroll-Scott et al. discovered that neighborhood environments are an important factor in preventing childhood obesity and its adverse consequences.[24] Neighborhood-built environments, such as access to fast food versus grocery stores or parks versus no parks, were associated with body mass index (BMI) and health behaviors.[25] Higher levels of property crimes and living further from a grocery store were also associated with a higher BMI. Conversely, access to parks, playgrounds, and gyms was associated with more frequent healthy eating and exercise.[26]

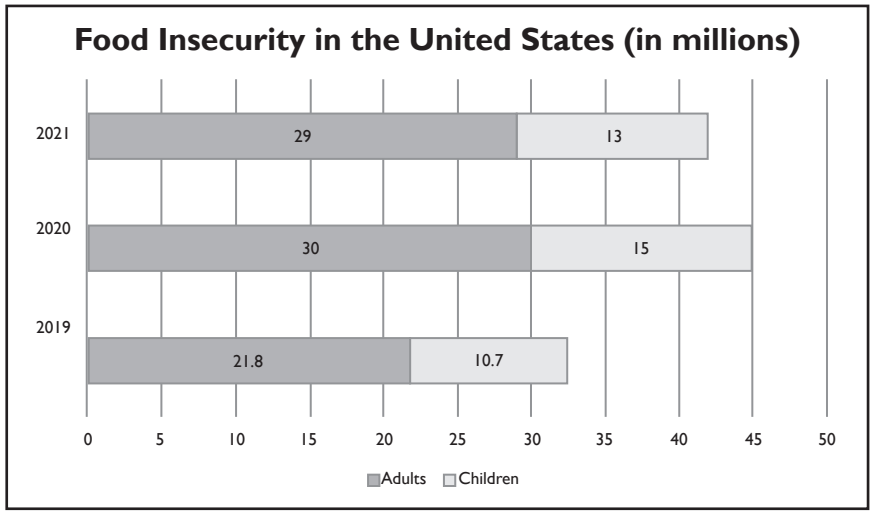
Local food environments may also play a role in reducing overweight and obese populations. The prevalence of obese and overweight individuals was lowest in areas that had only supermarkets. Areas that had a combination of supermarkets and grocery stores also had low obesity rates.[27] The prevalence of obese and overweight individuals was the highest in areas with grocery stores and convenience stores only.[28] Further, students living within a five-minute walk of a fast food outlet were found to have higher BMIs, and those living in areas with a higher density of fast food outlets reported less frequent healthy eating and more frequent unhealthy eating.[29] Some studies have also found that areas with primarily Black residents tend to have fewer supermarkets than wealthier neighborhoods with predominantly White residents.[30] However, other studies have found no correlation.[31]

B. Food Insecurity and Food Deserts

Deeply connected to health impacts and food swamps is food insecurity and food deserts.[32] In 2020, 14.8% of households with children were food insecure.[33] In 2020, 10.5% of U.S. households were food insecure, including 35.3% of households with incomes below the federal poverty line. In addition, 3.9% of households (or 5.1 million households) experiencing very low food security.[34] "Very low food security" occurs when "food intake of household members is reduced and their normal eating patterns are disrupted because the household lacks money and other resources for food."[35] Some characteristics of very low food secure households include a concern that there is not sufficient money to buy any food or nutritious food, adults are reducing or skipping meals because of a lack of money at least a few times a year, and a loss of weight due to lack of money to buy food.

The COVID-19 pandemic exacerbated food insecurity. Feeding America estimates that 42 million people (1 in 8), including 13 million children (1 in 6), may have experi-

17. Julia Bird et al., *Risk of Deficiency in Multiple Concurrent Micronutrients in Children and Adults in the United States*, 9 Nutrients 655 (2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5537775/.
18. Mayo Clinic, *Anemia*, https://www.mayoclinic.org/diseases-conditions/anemia/symptoms-causes/syc-20351360 (last visited July 8, 2021).
19. Bird et al., *supra* note 17.
20. Kelly Brooks, *Research Shows Food Deserts More Abundant in Minority Neighborhoods*, Johns Hopkins Mag. (Spring 2014), https://hub.jhu.edu/magazine/2014/spring/racial-food-deserts/; Bird et al., *supra* note 17.
21. Bird et al., *supra* note 17.
22. Michael Via, *The Malnutrition of Obesity: Micronutrient Deficiencies That Promote Diabetes*, 2012 ISRN Endocrinology art. 103472 (2012), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3313629/.
23. *Id.*
24. Amy Carroll-Scott et al., *Disentangling Neighborhood Contextual Associations With Child Body Mass Index, Diet, and Physical Activity: The Role of Built, Socioeconomic, and Social Environments*, 95 Soc. Sci. & Med. 106 (2013), https://perma.cc/Y3E3-DU4G.
25. *Id.*
26. *Id.*
27. Kimberly Morland et al., *Supermarkets, Other Food Stores, and Obesity: The Atherosclerosis Risk in Communities Study*, 30 Am. J. Preventive Med. 333 (2006), https://perma.cc/BCZ7-6BM8 (defining "supermarkets" as "large corporate owned 'chain' food stores, distinguished grocery stores, or smaller non-corporate-owned food stores. Convenience stores included all food stores that carry a limited selection of foods, mostly snack foods, whether or not attached to a gas station.").
28. *Id.*
29. Carroll-Scott et al., *supra* note 24.
30. Paula Dutko et al., Economic Research Service, U.S. Department of Agriculture, Characteristics and Influential Factors of Food Deserts (2012) (ERR-140), https://www.ers.usda.gov/webdocs/publications/45014/30940_err140.pdf.
31. *Id.*
32. Some have added "food apartheid" as a way to describe the food injustice happening throughout the United States. *See* Christine Byrne, *It's Great That We Talk About "Food Deserts"—But It Might Be Time to Stop*, Huffington Post (July 4, 2019), https://www.huffpost.com/entry/food-desert-problem-access-healthy-options_n_5d1b910ee4b082e55370dee5 (quoting Professor Ashanté M. Reese as defining food apartheid as "intimately tied to policies and practices, current and historical, that come from a place of anti-Blackness").
33. Economic Research Service, U.S. Department of Agriculture, *Food Security and Nutrition Assistance*, https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance/ (last updated Sept. 30, 2021).
34. *Id.*
35. Economic Research Service, U.S. Department of Agriculture, *Definitions of Food Security*, https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx#characteristics (last updated Sept. 8, 2021).



enced food insecurity in 2021.[36] Many people who have been most impacted by the pandemic were food insecure or at risk of food insecurity before COVID-19 and are facing greater hardship since the pandemic began.[37] The chart below shows the number of food-insecure Americans in 2019, 2020, and 2021.

From October 1, 2017, to September 30, 2018, children accounted for 44% of all Supplemental Nutrition Assistance Program (SNAP) participants.[38] SNAP provides nutrition benefits to supplement the food budget of needy families.[39] The majority of the 50 million food-insecure people living in the United States are Black, Latino, or Native American.[40] For this reason and others, some refer to food deserts as food apartheid to express the intentional nature of land use laws designed to discriminate.

Lack of access to healthy food does not solely arise from a lack of financial access. Food insecurity is frequently found in low-income areas where the population lacks easy access to fresh fruit, vegetables, and other whole foods, often because of a lack of easy access to supermarkets. In 2010, the U.S. Department of Agriculture reported that 18 million Americans live more than a mile from a supermarket in urban/suburban areas and more than 10 miles from a supermarket in rural areas.[41]

Food insecurity can greatly impact health. People living in areas with the lowest availability of healthy food are 55% less likely to have a good quality diet than people living in areas with greater availability.[42] People living in neighborhoods with greater access to healthy food are also 45% less likely to develop diabetes over five years.[43]

Food-insecure households tend to be located slightly farther from large food retailers and slightly closer to convenience stores than food-secure households.[44] Furthermore, food-insecure households report traveling slightly farther to their primary food retailer, increasing costs.[45]

Food-insecure areas also tend to have higher rates of abandoned or vacant homes and residents who have lower levels of education, lower incomes, and higher unemployment.[46] Census tracts with higher poverty rates are more likely to be in food deserts than otherwise similar low-income census tracts in rural and in very dense (highly populated) urban areas.[47] For less dense urban areas, census tracts with higher concentrations of non-White populations are more likely to be in food deserts, while tracts with substantial increases in White populations between 1990 and 2000 were less likely to be identified as food deserts in 2000.[48]

Despite the health and other challenges presented by food swamps, food security, and food desserts, through modifications in local development laws, there is potential for change as illustrated in parts IV-VII.

II. Economic Impact on the Food System

In addition to social impacts, the impacts development has on the food system can affect the economy in several ways.

36. Feeding America, The Impact of the Coronavirus on Food Insecurity in 2020 & 2021 (2021), https://www.feedingamerica.org/sites/default/files/2021-03/National Projections Brief_3.9.2021_0.pdf.
37. *Id.*
38. Economic Research Service, *supra* note 33.
39. Food and Nutrition Service, U.S. Department of Agriculture, *Supplemental Nutrition Assistance Program (SNAP)*, https://www.fns.usda.gov/snap/supplemental-nutrition-assistance-program (last visited Nov. 3, 2021).
40. Elsadig Elsheikh & Nadia Barhoum, Structural Racialization and Food Insecurity in the United States (2013), https://belonging.berkeley.edu/sites/default/files/Structural%20Racialization%20%20%26%20Food%20Insecurity%20in%20the%20US-%28Final%29.pdf.
41. Courtney H. Lee, *Grocery Store Inequity*, Sojourners (Apr. 2017), https://perma.cc/UXW9-BTXX.
42. *Food Deserts in America (Infographic)*, Tulane Univ. Sch. Soc. Work Blog (May 10, 2018), https://perma.cc/7KE7-Q7VS.
43. *Id.*
44. Brian J. Thomas, *Food Deserts and the Sociology of Space: Distance to Food Retailers and Food Insecurity in an Urban American Neighborhood*, 4 Int'l J. Humanities & Soc. Sci. 1545 (2010), https://publications.waset.org/10864/pdf.
45. *Id.*
46. Dutko et al., *supra* note 30.
47. *Id.*
48. *Id.*

Healthcare costs, the distance food travels, the direct cost of food, and food waste are parts of the food and agriculture system that have a significant impact on the economy. Smart development code changes can help reduce these costs while improving the food system. Below, we explore some of these costs.

A. Healthcare Costs

Americans are getting sick because of, among other things, contaminants in the water, soil, and air.[49] The location and use of various food and agricultural activities can have significant impacts on human health. As discussed above, food swamps, deserts, and insecurity impact health. These impacts have a real cost on the health system and on individual's health care.

In addition, other uses such as concentrated animal feeding operations (CAFOs) can create favorable environments for pathogens to spread and mutate that impact human health.[50] CAFOs frequently use low doses of antibiotics for extended periods, leading to antibiotic-resistant bacteria.[51] These antibiotic-resistant bacteria are transmitted to humans through water, fertilizer use, dust, and consumption of meat.[52] Each year more than 2 million Americans become ill with antibiotic-resistant infections, and more than 23,000 people die.[53] In addition to the tragic emotional and psychological impact, this has significant impacts on the cost of healthcare. In the United States, antibiotic-resistant infections cause health costs of $20 to $34 billion annually.[54]

B. Food Transportation Costs

The term "food miles" refers to the total geographic distance food is transported along its journey from cultivation to processing to distribution and to the consumer at the point of sale. Processed food in the United States travels over 1,300 miles before it reaches the table and fresh produce travels over 1,500 miles before being consumed.[55] This long-distance transportation of food consumes large quantities of fossil fuels. It is estimated that we currently put almost 10 kilocalories of fossil fuel energy into our food system for every 1 kilocalorie of energy we get as food.[56] The distance food travels adds a direct cost as well as an ecosystem cost associated with greenhouse gas emissions and other environmental impacts.

During peak times when crops are in season and available, local food purchased at farmers markers can be less expensive than imported food purchased at a supermarket.[57] Shorter transportation distances and lower packaging costs partially explain why farmers market prices can be lower than supermarket prices.[58] However, despite similar costs, local food can create equity issues as not everyone has access to farmers markets or time to shop there.[59] Farmers markets are not open as frequently as supermarkets that may be open 24 hours, creating difficulty for those whose work schedules that prevent them from shopping during farmers market hours.

Some farmers markets have attempted to broaden their consumer base by providing "Double Up Food Bucks," which match fruit and vegetable purchases for SNAP participants up to $20 per day.[60] Federal initiatives, such as "Know Your Farmer, Know Your Food," and federal funding that supports farm to school programs and investments in local infrastructure, such as food hubs, are helping to expand local food systems.[61]

There are also positive signs that local governments are taking advantage of the benefits stemming from farmers markets. Farmers markets grew by 76% from 2008 to 2014.[62] Farmers markets can help support healthy communities by lowering BMIs, educating shoppers, improving diets, and creating healthy social connections.[63] As discussed in the recommendations, development codes can support this effort by permitting and encouraging farmers markets and local fruit and vegetable sales in more zoning districts.

C. Food Waste Costs

It takes 780 million pounds of pesticides, 4.2 trillion gallons of water, 30 million acres of cropland, and nearly 2 billion pounds of fertilizer to grow the food that is *wasted* in the United States each year.[64] It is estimated that between

49. Amanda Merck, *5 Ways Our Current Food Systems Make Us Sick*, Salud America! (Jan. 24, 2020), https://salud-america.org/5-ways-our-current-food-systems-make-us-sick/.
50. *Id.*
51. *Id.*
52. *Id.*
53. *Id.*
54. *Id.*
55. ATTRA, Food Miles: Background and Marketing (2008), https://attra.ncat.org/product/food-miles-background-and-marketing; *Food & Transportation*, Conscious Club (May 21, 2019), https://www.theconsciouschallenge.org/ecologicalfootprintbibleoverview/food-transportation.
56. David Pimentel et al., *Energy in Food Production*, 38 Am. Biology Teacher 402 (1976).
57. Christine Sauer, *Is Local Food More Expensive? A Grand Rapids Case Study* (Grand Valley State Univ. Honors Projects, No. 156, 2012), http://scholarworks.gvsu.edu/honorsprojects/156.
58. *Id.*
59. *Id.*
60. Double Up Food Bucks Michigan, *Get Double the Fruits and Veggies*, https://doubleupfoodbucks.org/ (last visited July 16, 2021).
61. Emily B. Leib et al., Blueprint for a National Food Strategy (2017), https://foodstrategyblueprint.org/wp-content/uploads/2020/10/Food-Strategy-Blueprint.pdf.
62. Amy Leibrock, *Good Growth: Farmers Markets Still on the Rise*, Sustainable Am. (Aug. 6, 2014), https://sustainableamerica.org/blog/good-growth-farmers-markets-still-on-the-rise/.
63. Farmers Market Coalition, *Farmers Markets Support Healthy Communities*, https://farmersmarketcoalition.org/education/farmers-markets-support-healthy-communities/ (last visited Nov. 3, 2021).
64. Zach Conrad et al., *Relationship Between Food Waste, Diet Quality, and Environmental Sustainability*, 134 PLoS ONE e0195405 (2018), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0195405; Chris Mooney, *The Staggering Environmental Footprint of All the Food That We Just Throw in the Trash*, Wash. Post (Apr. 18, 2018), https://www.washingtonpost.com/news/energy-environment/wp/2018/04/18/americans-waste-about-a-quarter-of-the-food-they-buy-and-the-environmental-consequences-are-staggering/.

30% and 40% of food is wasted.[65] The average person in the United States wastes about a pound of food per day,[66] 50% more than in 1970.[67] Approximately 38% of grain products, 50% of seafood, 52% of fruits and vegetables, 22% of meat, and 20% of milk are lost.[68] The average American consumer spends approximately $1,300 each year on food that ends up being wasted.[69]

Food waste costs the world $2.6 trillion each year.[70] If food does not meet strict aesthetic standards, it is often discarded and frequently left in the field to rot.[71] Even when aesthetically pleasing, it can be cheaper for farmers to leave produce in the field rather than sell or donate it due to the labor costs of harvesting.[72] When the retail prices of produce are too low, farmers cannot cover their costs, make a profit, or stay in business.[73] Boxes for toting produce can cost $1 each while picking and packing can add $4.50 per box.[74] With additional costs in transportation and storage and fluctuating crop prices, farmers, at times, simply cannot afford to harvest the crops, especially ones that are unlikely to sell because of aesthetic reasons.[75]

Additionally, supermarkets may throw out food that is nearing its sell-by date, believing it is a health and safety issue or believing they cannot sell the product.[76] There is a common misconception that donating these foods will result in lawsuits.[77] However, at least one report stated that there has not been a single case that involved food donation-related liability.[78] If food is donated to a charity, the donor may be protected from liability under the Bill Emerson Good Samaritan Food Donation Act, which protects the donor from being sued if the donation is made in good faith.[79]

Food waste is the number one material in American landfills, accounting for 24.1% of all municipal solid waste according to the U.S. Environmental Protection Agency, leading to significant greenhouse gas emissions.[80] Decomposing food waste in landfills contributes 16% of U.S. methane emissions.[81] As discussed below in the "Consumption" section, different foods have different amounts of greenhouse gas emissions associated with their production.

III. Environmental Impact on the Food System

The impacts the food system has on the environment cannot be understated. Almost all phases of a food product's life cycle impact some aspect of the environment. Food systems heavily depend on natural resources, including land, soil, water, biodiversity, minerals for crops and animals, and fossil fuels.[82] Food systems can be a huge driver of environmental impacts, and therefore managing how development affects the food system can help address critical environmental issues, such as loss of biodiversity, soil degradation, water depletion, and greenhouse gas emissions.

A. *Production*

During the production of food, the United States loses almost two billion tons of topsoil per year.[83] In 2015, a U.N. Food and Agriculture Organization report determined that global topsoil will be gone in only 60 more harvests.[84] In addition, 33% of the world's soil is moderately to highly degraded due to erosion, nutrient depletion, acidification, salinization, compaction, and chemical pollution.[85]

It is estimated that the yearly cost of erosion from agriculture in the United States is $44 billion per year.[86] This erosion has reduced yields, with a reduction in the Midwest by 20%-40% for row crops.[87] Soil compaction due to mechanized agriculture and development is also an issue, with losses due to land compaction in the United States costing an estimated $1.2 billion per year.[88]

In his paper published in 2000, Steven Shrybman argued that "the globalization of agricultural systems over recent decades is likely to be one of the most important causes of overall increases in greenhouse gas emissions."[89]

65. Ryan Cooper, *Food Waste in America: Facts and Statistics*, Rubicon (Aug. 25, 2020), https://www.rubicon.com/blog/food-waste-facts/.
66. Conrad et al., *supra* note 64.
67. Center for Sustainable Systems, University of Michigan, U.S. Environmental Footprint Factsheet (2021), https://css.umich.edu/factsheets/us-environmental-footprint-factsheet.
68. Cooper, *supra* note 65.
69. Adrienne Berard, *Study Calculates True Cost of Food Waste in America*, William & Mary (Apr. 20, 2020), https://www.wm.edu/news/stories/2020/study-calculates-true-cost-of-food-waste-in-america.php.
70. Media Release, FiBL, Food Wastage Costs the World 2.6 Trillion Dollars Each Year, FiBL (Oct. 1, 2014), https://www.fibl.org/en/info-centre/news/food-wastage-costs-the-world-2-6-trillion-dollars-each-year.html.
71. *Id.*
72. Dana Gunders, NRDC, The Dating Game: How Confusing Food Date Labels Lead to Food Waste in America (2013), https://www.nrdc.org/resources/dating-game-how-confusing-food-date-labels-lead-food-waste-america.
73. Susan Salisbury, *EXCLUSIVE: Farms Leave Produce to Rot in Fields as Crop Prices Plummet*, Palm Beach Post (Jan. 12, 2017), https://www.palmbeachpost.com/business/exclusive-farms-leave-produce-rot-fields-crop-prices-plummet/QloOnGlEff02JwTCzDR5GI/.
74. *Id.*
75. *Id.*
76. University of Arkansas School of Law, Food Recovery: A Legal Guide (2013), https://law.uark.edu/documents/2013/06/Legal-Guide-To-Food-Recovery.pdf.
77. *Id.*
78. *Id.*
79. *Id.*
80. Cooper, *supra* note 65.
81. Sarah J. Morath, *Regulating Food Waste,* 48 Tex. Env't L.J. 239 (2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2945600.
82. Richard Halopka, *The High Cost of Soil Erosion*, Farm Progress (Sept. 27, 2017), https://www.farmprogress.com/soil-health/high-cost-soil-erosion.
83. Matt Hansen, *America Is Running Out of Soil*, Week (May 13, 2015), https://theweek.com/articles/554677/america-running-soil.
84. Maria Gerasimova et al., *Introduction*, *in* Status of the World's Soil Resources (Food and Agriculture Organization of the United Nations 2015), http://www.fao.org/3/bc590e/bc590e.pdf.
85. Soil Is a Non-Renewable Resource. Its Preservation Is Essential for Food Security and Our Sustainable Future (2015), http://www.fao.org/resources/infographics/infographics-details/en/c/278954.
86. Dede Sulaeman & Thomas Westhoff, *The Causes and Effects of Soil Erosion, and How to Prevent It*, World Res. Inst. (Feb. 7, 2020), https://www.wri.org/insights/causes-and-effects-soil-erosion-and-how-prevent-it.
87. *Id.*
88. *Id.*
89. Steven Shrybman, West Coast Environmental Law Association, Trade, Agriculture, and Climate Change: How Agricultural Trade Policies Fuel Climate Change (2000), https://www.iatp.org/sites/default/files/Trade_Ag_and_Climate_Change.pdf.

Over 10% of all greenhouse gas emissions in the United States come from industrial agriculture, which releases 600 million tons of carbon dioxide equivalent into the air each year.[90] Production accounts for the majority of greenhouse gas emissions in agriculture, which mostly come from soil microbial processes and manure.[91] Fertilizer is a major source of nitrous oxide emissions, which escape from the soil into the atmosphere.[92] Fertilizer is also energy intensive to produce. It is estimated that fertilizer production is the second largest energy demand of agricultural production, but is typically excluded from calculations of the agriculture sector's energy demands.[93]

Animal waste is frequently used as fertilizer, but synthetic fertilizers have also become commonplace.[94] Chemical fertilizers and animal manure provide crops with the nitrogen and phosphorus they need to grow, but when these chemicals are not fully used by the growing plants or overapplied they can be lost from the farm and negatively impact air and water quality.[95] Nitrogen can be lost through the air from fields in the form of gaseous compounds such as ammonia and nitrogen oxides.[96] Ammonia can harm aquatic life if large amounts are transferred from the atmosphere to the surface waters, while nitrous oxide is a potent greenhouse gas.[97]

Excess nitrogen and phosphorus can also be washed away from fields by rain or snow, or leach through the soil and into groundwater over time.[98] When these seep into waterways, they can cause algae blooms that kill off fish and other aquatic species.[99] As shown in the map below, much of the United States is affected by shallow groundwater contamination by nitrate.[100] States report that 40% of the waters surveyed are too contaminated for basic uses such as fishing and swimming.[101] Relatively high nitrogen concentrations occur in streams and shallow groundwater in the Central Valley of California and parts of the Northwest, Great Plains, and Mid-Atlantic regions because natural characteristics favor the transport of nitrogen.[102]

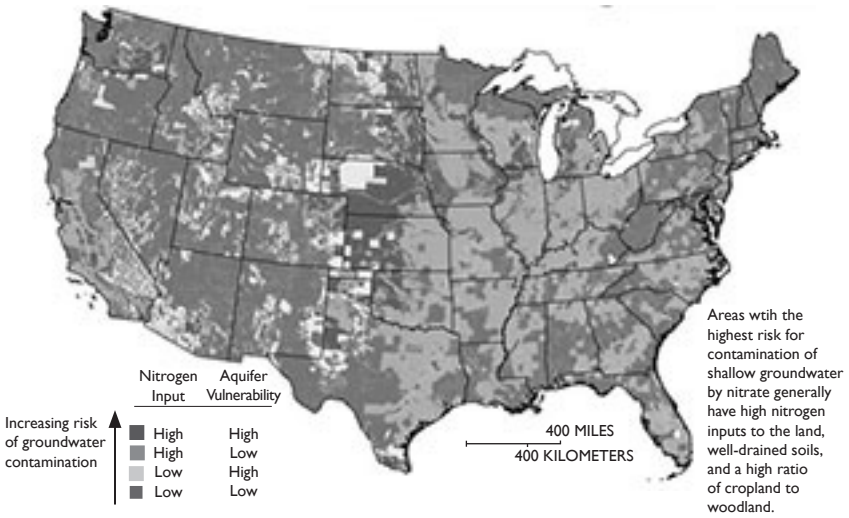
In the United States, agriculture accounts for 80% to 90% of consumptive water use.[103] Several agricultural activities and CAFOs are exempt from the Clean Water Act (CWA), which results in much of agricultural production being exempted from the law.[104] Even though agriculture is a large source of pollution in rivers, streams, and wetlands, the exemptions from the CWA mean that water pollution regulations generally do not cover farms.[105] This leaves much of the regulation of these activities to states and local governments when not preempted by state laws.

Synthetic pesticides have led to increases in crop yields by protecting crops from some destructive pests.[106] However, widespread pesticide use increases negative environmental impacts. Pesticides and their breakdown products can be carried via the air drift during application, dust created by wind or tillage, surface runoff during irrigation or rainfall, sediment carried by runoff, leaching through the soil into groundwater, or volatilizing into the air and depositing onto surfaces.[107] In agricultural areas in the United States, pesticides were detected in 97% of sampled streams and 61% of sampled shallow groundwater areas.[108] Organochlorine, a pesticide compound that has largely been discontinued, has been detected in 92% of fish tissue samples.[109]

Pesticides applied to crops may have a significant adverse impact on pollinating insects.[110] The loss of pollinators affects wild plant populations as well as yields of crops such as fruits and nuts.[111] There has been a 75% decline over 30 years in flying insect biomass.[112] Insect pollinators such as bees contributed $29 billion to U.S. farm income in 2010.[113] The loss of these flying insects could be devastating for agriculture and the food system.

Additionally, 60% of global terrestrial biodiversity loss is related to food production.[114] In the United States, habitat loss and degradation are the leading causes of species decline.[115] Improper agricultural methods can elevate con-

90. U.S. Environmental Protection Agency, *Sources of Greenhouse Gas Emissions*, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions (last visited July 9, 2021).
91. U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks (last visited July 9, 2021).
92. Patrick Canning et al., Economic Research Service, U.S. Department of Agriculture, Energy Use in the U.S. Food System (2010) (ERR-94), https://www.ers.usda.gov/publications/pub-details/?pubid=46377.
93. Shrybman, *supra* note 89.
94. U.S. Environmental Protection Agency, *The Sources and Solutions: Agriculture*, https://www.epa.gov/nutrientpollution/sources-and-solutions-agriculture (last visited July 9, 2021).
95. *Id.*
96. *Id.*
97. *Id.*
98. *Id.*
99. *How Fertilizers Harm Earth More Than Help Your Lawn*, Scientific Am. (July 20, 2009), https://www.scientificamerican.com/article/how-fertilizers-harm-earth.
100. U.S. Geological Survey, The Quality of Our Nation's Waters—Nutrients and Pesticides (1999), https://pubs.usgs.gov/circ/circ1225/.
101. *Id.*
102. *Id.*
103. Economic Research Service, U.S. Department of Agriculture, *Irrigation & Water Use*, https://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/background/ (last updated Aug. 27, 2021).
104. Leib et al., *supra* note 61.
105. *Id.*
106. Institute of Medicine & National Research Council, A Framework for Assessing Effects of the Food System 4 (Malden C. Nesheim et al. eds., 2015), https://www.nap.edu/catalog/18846/a-framework-for-assessing-effects-of-the-food-system.
107. *Id.*
108. *Id.*
109. *Id.*
110. *Id.*
111. *Id.*
112. Caspar A. Hallmann et al., *More Than 75 Percent Decline Over 27 Years in Total Flying Insect Biomass in Protected Areas*, 12 PloS One e0185809 (2017), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0185809.
113. Krishna Ramanujan, *Insect Pollinators Contribute $29 Billion to U.S. Farm Income*, Cornell Chron. (May 22, 2012), https://news.cornell.edu/stories/2012/05/insect-pollinators-contribute-29b-us-farm-income.
114. PBL Netherlands Environmental Assessment Agency, How Sectors Can Contribute to Sustainable Use and Conservation of Biodiversity (2014), https://sustainabledevelopment.un.org/content/documents/1981cbd-ts-79-en.pdf.
115. Paul Tolmé, *The U.S. Biodiversity Crisis*, Nat'l Wildlife Fed'n (Jan. 30, 2017), https://www.nwf.org/Magazines/National-Wildlife/2017/Feb-March/Conservation/Biodiversity.



*U.S. Geological Survey, The Quality of Our Nation's Waters—Nutrients and Pesticides (1999), https://pubs.usgs.gov/circ/circ1225/..

centrations of nutrients, fecal bacteria, and sediment loads in waterways, damaging habitats.[116] Animal waste in water bodies can damage aquatic ecosystems and introduce bacteria that may threaten public health.[117]

According to the North American Bird Conservation Initiative, more than a third of North American birds are at risk of extinction without significant action.[118] It is estimated that a third of U.S. species of flora and fauna are at risk, with aquatic life being particularly vulnerable.[119] More than 500 U.S. species are already considered extinct or missing.[120]

B. Consumption

By some estimates, the U.S. population is expected to grow from 329 million people in 2020 to 404 million people by 2060.[121] The average American's daily calorie consumption increased from 2,054 in 1970 to 2,501 in 2010.[122] Between 1983 and 2000, food availability in the United States increased by 600 calories per person.[123] This increase was fueled by 100.6 million hectares of land and fishing area.[124]

Dietary choices affect environmental outcomes. The United States has the second-highest rate of meat consumption in the world, averaging 198.51 pounds of meat consumed per person, per year.[125] Beef creates 99.48 kilograms of carbon dioxide equivalents per kilogram of food produced.[126] Meanwhile, tofu production creates 3.16 kilograms of carbon dioxide equivalents per kilogram of food produced.[127] Consuming less meat can help reduce greenhouse gas emissions. Even simply shifting the type of meat consumed can make an impact. Red meat is around 150% more greenhouse gas intensive than chicken or fish.[128]

C. Transportation

Transportation of food accounts for about 11% of the greenhouse gas emissions from the food system.[129] While cities are the major centers of consumption in the United States, food is generally grown elsewhere and needs to be transported long distances to reach consumers. Food typically takes a long journey from the primary producer to process and packaging facilities, to regional and then local distribution centers, to retailers, and then to homes and other places people typically consume food.[130] Energy demands can vary greatly depending on the mode of transportation used.[131] While the environmental impacts of our food system cannot be changed through modifications to local law and zoning codes alone, some changes can be made on a local level that will make a large impact.

116. Utah State University Extension, *Water Quality—Agriculture*, https://extension.usu.edu/waterquality/learnaboutsurfacewater/usesofwater/agriculture (last visited July 9, 2021).
117. *Id.*
118. NABCI, *State of North America's Birds 2016*, https://www.stateofthebirds.org/2016/ (last visited July 16, 2021).
119. Bruce A. Stein et al., Precious Heritage: The Status of Biodiversity in the United States (Oxford Univ. Press 2000).
120. *Id.*
121. Center for Sustainable Systems, *supra* note 67.
122. *Id.*
123. Dorothy Blair & Jeffery Sobal, *Luxus Consumption: Wasting Food Resources Through Overeating*, 23 Agric. & Human Values 63 (2006), https://link.springer.com/article/10.1007/s10460-004-5869-4.
124. *Id.*
125. University of British Columbia, *Environmental Impact of Meat Consumption*, https://cases.open.ubc.ca/environmental-impact-of-meat-consumption/ (last visited July 20, 2021).
126. Hannah Ritchie & Max Roser, *Environmental Impacts of Food Production*, Our World in Data (Jan. 2020), https://ourworldindata.org/environmental-impacts-of-food.
127. *Id.*
128. Christopher L. Weber & H. Scott Matthews, *Food-Miles and the Relative Climate Impacts of Food Choices in the United States*, 42 Env't Sci. & Tech. 3508 (2008), https://pubs.acs.org/doi/10.1021/es702969f.
129. *Id.*
130. Shrybman, *supra* note 89.
131. *Id.*

IV. Positive Changes and Model Communities

Many communities throughout the United States have implemented positive measures to help strengthen the food system while continuing to develop and grow. These are local governments that have taken the bold step to implement policies to ensure that development occurs in a way that supports the local and national food system. Many of these initiatives are explained in *Remarkable Cities and the Security and Sovereignty of Food and Nutrition*,[132] which describes concrete ways for communities to amend development codes and adapt to changes as they occur.

The book stems from the Sustainable Development Code, which aims to help all local governments, regardless of size and budget, build more resilient, environmentally conscious, economically secure, and socially equitable communities. The book is organized by recommendations that remove barriers (examples in Part V below), create incentives (examples in Part VI below), and fill regulatory gaps (examples in Part VII below). It also includes examples of local governments that have adopted the recommendation, so readers can see how these recommendations work in real life. A few of the recommendations and examples from that book are excerpted below.

V. Removing Barriers

A. *Clustered and Conservation Subdivision in Rural/Urban Interface*

Clustered/Conservation Subdivision (CCS) ordinances allow residential developments in rural and urban fringe areas while retaining the natural character and significant wildlife habitat in the newly developed area. CCS developments are an alternative to traditional residential developments (often subdivisions and/or planned unit developments) that typically result in substantial destruction of natural features and habitats.[133] In contrast, CCS ordinances allow or require dense clusters of residential units in one part of the proposed project area, in exchange for permanently preserving open space and natural features.[134] Under this model, the open space is rendered undevelopable, but may be used by the community for recreation, agriculture, or conservation.[135] Placing CCS developments near the urban/rural boundary helps provide a natural transition from dense urban areas to more open and natural spaces.

Local governments may structure CCS ordinances in a variety of ways. Some local governments have chosen to create overlay districts that indicate where a CCS may be located.[136] Others may choose to allow a CCS directly in the regulations for various zones, most typically residential zones.[137] The ordinance should also describe the design standards for the CCS, such as maximum allowable surface coverage, minimum amount of open space required, and where or how the new residences will be clustered on the parcel. Local governments should note that CCS developments often require smaller minimum lot sizes than the underlying zoning district would otherwise allow to accommodate for tight clusters of buildings, so that more open space may be preserved.

Many jurisdictions simply exempt CCS developments from minimum lot size requirements.[138] In many ordinances, there is a formula or ratio that indicates how much space developers must leave open. These formulas and ratios may be based on prior use patterns for new developments in communities that have traditionally had access to public open spaces, or they can be tailored to meet the needs of developments in communities that have historically been without open spaces. Finally, it is important for a municipality to specify what happens to the development rights of the preserved open space. Some local governments retain those development rights indefinitely, while others allow the transfer of those rights to non-profit land trust entities or a homeowners association.[139]

1. Effects

Promoting CCS developments provides numerous benefits to local governments. First, preserving open space and wildlife habitat provides a natural corridor for wildlife to travel, and therefore increases the biodiversity in the jurisdiction.[140] One study found a strong correlation between using cluster type developments and the increased preservation of wildlife habitat and biodiversity, as compared to traditional residential developments, which had less wildlife habitat and biodiversity.[141] Second, the preservation of open space allows existing greenspace to continue to provide ecosystem services. Greenspace is open, undeveloped, or vegetated land that captures greenhouse gas (GHG) emissions and allows wildlife to move freely through a natural landscape.[142] The services that greenspace provide also include air purification, stormwater management and

132. Jonathan Rosenbloom, Remarkable Cities and the Fight Against Climate Change (ELI Press 2020), https://www.eli.org/eli-press-books/remarkable-cities-and-fight-against-climate-change.
133. Charlotte E. Gonzales-Abraham et al., *Patterns of Houses and Habitat Loss From 1937 to 1999 in Northern Wisconsin, USA*, 17 Ecological Applications 2011, 2017 (2007).
134. Randall Arendt, Rural by Design: Maintaining Small Town Character 229-32 (American Planning Association 1994).
135. For alternative ways to zone the PUD open space, see Sustainable Development Code, Limit PUDs Near Sensitive Natural Areas, https://sustainablecitycode.org/brief/limit-puds-near-sensitive-natural-areas/.
136. *See, e.g.*, Jamestown, R.I., Code of Ordinances §82-1600 (2003).
137. *See, e.g.*, Grayslake, Ill., Zoning Ordinance §17.32.100(D) (current through 2018).
138. *See, e.g.*, Loudon County, Va., Code of Ordinances §1226.02(a) (1998); Concord, Mass., Zoning Bylaw §§9.1-9.5 (1962).
139. *See, e.g.*, Jamestown, R.I., Code of Ordinances §82-1608 (2003).
140. John Roach, *First Evidence That Wildlife Corridors Boost Biodiversity, Study Says*, Nat'l Geographic News (Sept. 1, 2006), https://perma.cc/RE8J-2LMT.
141. Gonzales-Abraham et al., *supra* note 133.
142. U.S. Environmental Protection Agency, *What Is Open Space/Green Space?*, https://perma.cc/ET63-53V6 (last visited May 18, 2018).

treatment, and soil retention.[143] Third, CCS developments help to ensure prime farmland is available to local farmers. Finally, one study found that homes in CCS developments gain monetary value at a quicker rate than traditional residential subdivisions.[144] Both homeowners and local governments may benefit from the resulting increase in assessed property value.

In contrast, a traditional residential subdivision consumes almost all of the greenspace on a parcel, which shifts costs to local governments to replace the loss of ecosystem services and potential farmland. Traditional residential subdivisions can also damage or destroy wildlife habitat and block existing wildlife corridors, thereby pushing wildlife out of the jurisdiction and harming overall biodiversity.[145] CCS ordinances mitigate these harms by allowing residential developments that complement the natural environment and preserve substantial wildlife corridors and habitat.[146]

2. Examples

☐*Thurston County, Washington.* Thurston County is home to the state capitol of Olympia, which sits near the northern edge of the county border. Olympia has a large metropolitan area, but much of the County is rural and zoned as "Long Term Agriculture" (LTA) or "Long Term Forestry" (LTF).[147] Within these zones the County requires low density housing, which in some instances can mean one dwelling unit per eighty acres.[148] However, a landowner in a LTF or LTA district can apply to create a "Planned Rural Residential Development" (PRRD).[149] These PRRDs are exempt from minimum lot size requirements, allowing a developer to maximize profits while also retaining the rural character of the area.[150]

PRRDs require the creation of a "resource parcel."[151] The composition of the resource parcel varies based on the underlying zoning district. For instance, in LTA districts the parcel must be used for agriculture, while in LTF districts the resource parcel must consist of forested land.[152] The percentage of the lot dedicated to the resource parcel also varies. In LTA districts, 85% of the PRRD must be a resource parcel.[153] In LTF districts, 75% of the PRRD must be a resource parcel.[154] In all cases, the resource parcel must be one contiguous area of land, not intermingled with any residential developments.[155] This requirement insures that the residential development is limited to a small portion of the total platted area, thereby preserving natural wildlife corridors and habitat.

The County further regulates how residences are situated in the PRRD. Homes must blend in with the natural features as seen from the public roadway, and the configuration and size of lots must vary.[156] Lots must be grouped, rather than arranged in a linear fashion.[157] The goal of these requirements is to provide unhindered access and use of the resource parcel, and promote a pleasant rural aesthetic as viewed from the highway.[158] To view the provisions, see Thurston County, WA, Code of Ordinances §20.30A (1993).

☐*Jameston, Rhode Island*. Jamestown is located on an island just West of Newport, Rhode Island. A majority of the jurisdiction is zoned for low-density residential uses.[159] Within three of the largest of those zones, clustered development is *required* for any subdivision of land over five acres (emphasis added).[160] The planning commission will only approve a traditional type residential development if it determines that a clustered development is inappropriate due to "land configuration, prevailing development adjacent to the parcel, or environmental condition."[161]

In a cluster development, the town requires that 50% of the area be devoted to open space.[162] Permitted uses in the open space are limited to conservation, recreation, agriculture, and preservation of historic sites.[163] However, a developer may construct certain structures in the open space, such as walkways, retaining walls, recreational facilities, or utilities.[164] Notably, any open space that has been deemed "unsuitable for development" will not count towards the 50% requirement.[165] The open space must then be conveyed to the town, to a cooperative or homeowners association, or donated to a non-profit land trust entity.[166]

The town also sets minimum lot sizes for clusters based on the underlying zoning district. For example, in the zone designated as rural-residential that normally requires minimum lot sizes of 200,000 square feet, that requirement is reduced to 20,000 square feet.[167] On the other end of the spectrum, the zone that normally requires at least 40,000 square feet lots only requires 8,000 square feet lots in cluster developments.[168] To view the provisions, see Jamestown, RI, Code of Ordinances §§82-1600 to 1608 (2003).

143. J.B. Ruhl, *In Defense of Ecosystem Services*, 32 Pace Env't L. Rev. 306, 309 (2015).
144. Jeff Lacy, *An Examination of Market Appreciation for Clustered Housing With Permanent Open Space* (1990) (last updated Mar. 16, 2011).
145. Stephen DeStefano & Richard M. DeGraaf, *Exploring the Ecology of Suburban Wildlife*, 1 Frontiers Ecology & Env't 95, 101 (2003).
146. *See* Arendt, *supra* note 134.
147. Thurston County, Washington, *Official Zoning Map, Thurston County, Washington*, https://perma.cc/EX4E-JRM8 (last visited Jan. 10, 2019).
148. Thurston County, Wash., Code of Ordinances §20.08D.045 (2012).
149. *Id.* §20.30A (1993).
150. *Id.* §20.30A.070.
151. *Id.* §20.30A.040(1).
152. *Id.* §10.30A.040(3).
153. *Id.* §20.30A.040(1).
154. *Id.*
155. *Id.* §20.30A.070(5)(b).
156. *Id.* §20.30A.070(6)(a).
157. *Id.* §20.30A.070(6)(d).
158. *Id.* §20.30A.070(6)(d) (explanatory note).
159. Jamestown, Rhode Island, *Jamestown Zoning Map* (2009), https://perma.cc/7A5Z-WTK9.
160. Jamestown, R.I., Code of Ordinances §82-1602 (2003).
161. *Id.*
162. *Id.* §82-1604; *see also* Sustainable Development Code, Limit PUDs Near Sensitive Natural Areas, https://sustainablecitycode.org/brief/limit-puds-near-sensitive-natural-areas/.
163. Jamestown, R.I., Code of Ordinances §82-1606.
164. *Id.* §82-1607.
165. *Id.* §82-1606.
166. *Id.* §82-1608.
167. *Id.* §§82-1604, 82-800.
168. *Id.* §§82-1604, 82-302.

☐*Baltimore County, Maryland*. Baltimore County is a largely rural jurisdiction with the city of Baltimore on its Southern border. The County's zoning regulations establish several zones designed to preserve rural resources and the natural character of the county.[169] CCS developments are required in some cases for the subdivision of land in certain "Resource Conservation" districts.[170]

For example, in the Watershed Protection zone, any development of a parcel of land greater than ten acres must be a clustered design.[171] 70% of the tract must be reserved as the "conservancy area."[172] Whenever possible, the conservancy are must be a contiguous block of land that contains valuable ecological features such as prime soil, steep slopes, wetlands, and forests.[173] The conservancy area is required to be held by a single entity, such as a land trust or homeowner's association, and a permanent preservation easement must be placed over the area.[174] The entity that owns the area must also file an agreement with the county to take responsibility for maintaining the area and preserving it as is.[175] To view the provisions, see Baltimore County, MD, Zoning Regulations §1A03.5 (1992).

B. *Edible Front Yard Gardening in Residential Districts*

In 2015, 36% of U.S. households engaged in food gardening, spending $3.6 billion growing vegetables and other edible plants.[176] Driving this trend is the desire to reap the health, social, and economic benefits of personal food production, as well as a growing awareness of the negative ecological impact of traditional agriculture production.[177] Led by large-scale animal agriculture, traditional agriculture production is responsible for massive GHG emissions, deforestation, water pollution, and air pollution.[178] Helping to foster citizens' desire to grow food at their residences, local governments are eliminating traditional zoning strategies that prohibited or excessively limited food gardening.[179] The benefits of front yard gardening have overcome outdated notions of the "idealized" front lawn and are discussed in more detail below.[180] Additionally, traditional lawns require fertilization and other upkeep functions that negatively impact the environment.[181]

Ordinances allowing communities to grow food in front yards either expressly permit food gardens as a by-right accessory use[182] or exempt agricultural activities from landscaping requirements.[183] Ordinances permitting front yard gardens can set maintenance requirements for gardening and agriculture, such as ensuring pruning, weed removal, and pest control.[184] Additionally, local governments may prohibit some species of plants due to concerns over pests or invasive species.[185] Local governments may also permit some heavy or larger agricultural machinery in residential areas while implementing appropriate restrictions to avoid nuisance issues.[186]

Front yard gardens can take many different forms. Some gardeners remove traditional lawn landscaping and turn their entire front yard into elaborate vegetable gardens.[187] In other places, property owners garden in the "planting strip" of land between the street and sidewalk in front of their homes.[188] Other gardeners mix attractive edible plants into more traditional landscaping.[189] Local governments have sought to educate homeowners on these various approaches, as well as the benefits of front yard gardens, by providing support services making it easier for new gardeners to acquire baseline skills.[190] Local governments can help foster front yard gardening and gardening generally through educational programs operating outside of development codes. Depending on the amount of front yard gardening the local government wishes to allow, it may also consider farm stands.

As food gardening becomes more common, community members look for innovative ways to use space to grow food.[191] This can lead to challenges if traditional backyard space is not available or not suited to plant growth.[192] Even in cases where residents have sufficient back yard space, they may not have proper sunlight and other conditions that yield the best growth. In this case, homeowners can turn to front yard gardening. Local governments should be aware that as front yard gardening increases there may be an increase in conflicts with neighbors who find vegetable gardens unsightly or worry about declining prop-

169. *See* Baltimore, Md., Zoning Regulations §100.1(A)(2) (1975).
170. *See, e.g., id.* §1A03.4(B)(1)(b).
171. *Id.*
172. *Id.* §1A03.4(B)(1)(b)(1).
173. *Id.* §1A03.5(A)(1)(a)-(g).
174. *Id.* §1A03.5(C)(1)-(2).
175. *Id.*
176. *Survey Says More People Are Gardening, Even Millennials,* Garden Ctr. (May 18, 2016), https://perma.cc/A4X2-FJ9W (citing a National Gardening Survey).
177. Sheila Golden, *Urban Agriculture Impacts: Social, Health, and Economic—A Literature Review* (2013), https://perma.cc/5WAJ-YU3Q.
178. Alastair Bland, *Is the Livestock Industry Destroying the Planet?*, Smithsonian Mag. (Aug. 1, 2012), https://perma.cc/3AGX-M5R9.
179. Sarah B. Schindler, *Of Backyard Chickens and Front Yard Gardens: The Conflict Between Local Governments and Locavores*, 87 Tul. L. Rev. 231, 236 (2012), https://perma.cc/KT7H-ZC4G (providing historical context of front yard gardens).
180. *Id.* at 240.
181. *Id.* at 277.
182. Pittsburgh, Pa., Code of Ordinances §912.02 (2010).
183. Columbus, Ohio, Municipal Code §332 (2019).
184. Sacramento, Cal., City Code §§17.108.170, 17.108.220, 17.228.810(A)-(C) (2017).
185. *Id.;* For a discussion of native plant requirement ordinances, see Sustainable Development Code, Native Plants/Vegetation, https://sustainablecitycode.org/brief/require-use-of-native-plants-vegetation/; for a discussion of the removal of invasive species ordinances, see Sustainable Development Code, Removal of Exotic Vegetation, https://sustainablecitycode.org/brief/require-removal-of-exotic-vegetation-2/; and for a discussion specifically focusing on native and invasive trees, see Sustainable Development Code, Native Trees and Removal of Invasive Trees, https://sustainablecitycode.org/brief/require-native-trees-and-removal-of-invasive-trees-2/.
186. Duluth, Minn., Unified Development Chapter §50-20.3(B)(4)(d) (2020).
187. Ellen Brown, *4 Reasons to Plant a Vegetable Garden in the Front Yard*, Mod. Farmer (Aug. 19, 2014), https://perma.cc/3GML-DBVX.
188. Seattle Public Utilities, *Growing Food in Planting Strips*, https://perma.cc/NDP8-ED34 (last visited June 28, 2020).
189. Ivette Soler, The Edible Front Yard: The Mow-Less, Grow-More Plan for a Beautiful, Bountiful Garden 24 (2011).
190. *See, e.g.,* Seattle Public Utilities, *Growing Food in the City (2016)*, https://perma.cc/7ESR-H2G4.
191. Soler, *supra* note 189.
192. *Id.* at 8.

erty values.[193] Some local governments have used zoning ordinances to clarify the use of front yards for gardens to balance the needs of encouraging urban farming with the aesthetic sensibilities of neighbors.[194] Local governments can reflect concerns about the appearance of front yard gardens by not allowing invasive species[195] and requiring all urban agriculture to be well maintained and aesthetically pleasing.[196]

1. Effects

When zoning regulations allow gardening by-right on residential properties, homeowners face fewer barriers to producing their own food and may have greater access to healthy and fresh food.[197] Individuals who grow their own food are more likely to eat five servings of fruits and vegetables per day.[198] Gardening is linked to lessening the risks associated with obesity for both children and adults, coronary heart disease (particularly for menopausal women and elderly men), and glycemic control and diabetes.[199] Research also shows that those who participate in gardening activity benefit from reduced levels of stress and anxiety.[200] For senior citizens, one study found that gardening may reduce the risk of dementia by up to 36%.[201]

Front yard gardens are excellent opportunities for communities to capitalize on an underutilized resource while saving residents money. Many citizens often struggle to gain access to an affordable and nutritious diet.[202] Low-income residents can spend more than 60% of their earnings on food.[203] Home gardens offer a cheaper alternative, as individuals do not incur costs for transportation, distribution, or marketing of food.[204] If local regulations permit residents to sell their produce, gardeners may be able to supplement their income.[205] Residents may also be able to use surplus produce to help local neighbors in need.[206]

Gardens also provide social benefits to residents by serving as conversation pieces and allowing neighbors to meet and learn about each other.[207] Gardening can be a mechanism for nurturing resilience in communities facing challenges like poverty.[208] Gardens further community interests by facilitating intergenerational and multicultural exchange.[209] Traditionally marginalized groups such as "women, children, the poor, the homeless and the elderly" are given a valuable role within neighborhoods through inclusion in the food production process.[210] Additionally, home gardens provide an outlet for culturally significant produce that is not available in local grocery stores.[211]

Finally, urban gardening carries a host of environmental benefits. Gardens can reduce the impact of carbon emissions as a result of anaerobic respiration at landfills when gardeners utilize organic waste for compost.[212] Composting reduces costs of transportation of solid wastes to centralized waste facilities.[213] Composting can enrich soil, retain moisture, and suppress plant diseases and pests.[214] Additionally, it can also make gardening more efficient.[215] Carbon emissions are further reduced through urban agriculture by cutting down transportation costs of food from its source to individual homes.[216] In addition, food gardens may absorb more greenhouse gases than a typical lawn and may require less water. A greater amount of foliage helps to mitigate the effects of stormwater runoff and air pollution.[217] Finally, increases in plant life also promote urban biodiversity and species preservation[218] while reducing the heat island effect through photosynthetic carbon fixing.[219]

2. Examples

☐ *Pittsburgh, PA*. Pittsburgh allows front yard gardens as a by-right accessory use in residential districts.[220] Pittsburgh requires developed property to be landscaped when it is not being used for "buildings, structures, accessory uses, off-street parking, loading areas, sidewalks or similar features."[221] The Urban Agriculture section of the Code does not require property owners to obtain a permit if the sole purpose of growing crops is for personal consumption.[222] The right to grow and sell crops exists as a by-right

193. *See* Steven Kurutz, *The Battlefront in the Front Yard*, N.Y. Times (Dec. 19, 2012), https://perma.cc/U7TR-JH4R.
194. *Id.*; Orlando, Fla., Code of Ordinances §60.223(a)(2) (2013).
195. *Id.* §60.223(a)(4).
196. Sacramento, Cal., City Code §17.228.810(A) (2017).
197. Golden, *supra* note 177.
198. *Id.*
199. Anne C. Bellows et al., North American Initiative on Urban Agriculture, *Health Benefits of Urban Agriculture* (2008), https://perma.cc/47EE-7RNY.
200. Masashi Soga et al., *Gardening Is Beneficial for Health: A Meta-Analysis*, 5 Preventative Med. Rep. 92 (2017), https://perma.cc/V9JS-YX5H.
201. Kim Hayes, *5 Secret Health Benefits of Gardening*, AARP (June 14, 2017), https://perma.cc/LUX8-5SB3 (citing Leon A. Simons et al., *Lifestyle Factors and Risk of Dementia: Dubbo Study of the Elderly*, 184 Med. J. Aust. 68-70 (2006)).
202. *10 Ways Urban Farms Benefit the Community,* Ecology Ctr. (Mar. 1, 2016), https://perma.cc/2CKG-N6WA.
203. Alexandra D. Dunn, *Siting Green Infrastructure: Legal and Policy Solutions to Alleviate Urban Poverty and Promote Healthy Communities*, 37 B.C. Env't Aff. L. Rev. 41, 52 (2010), https://perma.cc/9AK8-JL9U.
204. Golden, *supra* note 177.
205. Dunn, *supra* note 203.
206. Schindler, *supra* note 179.
207. Brown, *supra* note 187.
208. Keep Growing Detroit, 2017 Annual Report (2017), https://perma.cc/SS4H-9J4P.
209. Golden, *supra* note 177.
210. Cities Farming for the Future: Urban Agriculture for Green and Productive Cities 146 (René van Veenhuizen ed., 2006), https://perma.cc/SDU6-CYZ2.
211. Golden, *supra* note 177, at 179.
212. David R. Johnston & Kim Master, Green Remodeling: Changing the World One Room at a Time 212-13 (2004).
213. *Id.*
214. U.S. Environmental Protection Agency, *Composting at Home*, https://perma.cc/JNP6-WLB6 (last visited July 8, 2020).
215. *Id.*
216. *10 Ways Urban Farms Benefit the Community*, *supra* note 202.
217. Kimberly Hodgson et al., Investing in Healthy, Sustainable Places Through Urban Agriculture 7 (2011), https://perma.cc/6FD7-WJCN.
218. *Id.*
219. *10 Ways Urban Farms Benefit the Community*, *supra* note 202.
220. Pittsburgh, Pa., Code of Ordinances §912.02 (2010).
221. *Id.* §918.02.A (2005).
222. *Id.* §912.07.A (2015).

use in 17 of the city's 22 districts.[223] To view the provisions, see Pittsburgh, PA, Code of Ordinances §§911.02, 912.02, 912.07.A, 918.02.A.

☐*Duluth, MN*. Duluth allows front yard gardening by imposing no restrictions other than fence height.[224] The maximum fence height is four feet.[225] Duluth requires structures related to the gardening process to be at least 20 feet from the front property line.[226] Duluth generally only permits mechanized equipment similar in scale to that designed for household use.[227] However, gardeners may use larger mechanized farm equipment in initial preparation of the land.[228] To view the provision, see Duluth, MN, Unified Development Chapter §50-20.3(B)(4)(d) (2020).

☐*Sacramento, CA*. Sacramento's code allows private gardens as an accessory use in residential districts.[229] The Code defines private gardens to include front yard gardens,[230] and classifies private gardens under its urban agriculture provision.[231] The urban agriculture definition allows food growth "in a form and scale that is appropriate for the urban context."[232] The city requires all urban agriculture to be well maintained, weeded, pruned, and free of litter.[233] The Code mandates pest control and removal of diseased plants.[234] With the exception of prepping the land for agricultural purposes, the regulation prohibits mechanized farm equipment in residential areas, unless it is designed for regular household use.[235] Structures such as greenhouses, hoop houses, and storage sheds are allowed subject to the rules of the underlying district.[236] To view the provisions, see Sacramento, CA, City Code §§17.108.170, 17.108.220, 17.228.810(A)-(C).

☐*Orlando, FL*. Orlando's Landscaping and Tree Protection ordinance seeks to promote water conservation, improve air and water quality, limit stormwater runoff, control the heat island effect, and increase community health and urban wildlife.[237] The ordinance requires all landscaping to be kept in a healthy condition.[238] For one- and two-family residences, the regulation requires 40% of front yards and side yards to be planted with shrubs, groundcovers, or a combination thereof.[239] The remaining 60% of the yard may be planted with a vegetable garden.[240] Property owners must select plants that are appropriate for soil conditions, moisture levels, and sun exposure.[241] The ordinance prohibits exotic or invasive species.[242] The ordinance also strongly recommends individuals take a course from the University of Florida Institute of Food and Agricultural Services to learn more about growing vegetables in Orlando's climate.[243] Vegetable gardens must have one of the following edge treatments around the perimeter: a 3 to 4 foot fence, a planter box with an 18-inch setback from rights-of-way, a "3 foot permanently planted buffer," or another type of landscape feature (such as a rain garden) subject to the approval of the Zoning Official.[244] To view the provisions, see Orlando, FL, Code of Ordinances §§60.201(a)-(i), 60.202, 60.223(a)(2)-(4), 60.223(j) (2013).

C. Additional Actions Described in the Book

The book, *Remarkable Cities and the Security and Sovereignty of Food and Nutrition*, contains further suggestions aimed at removing obstacles, including:

- Agricultural Overlay Zoning
- Aquaponics, Hydroponics, and Aquaculture
- Bees in Urban and Suburban Districts
- Commercial Sales of Food Produced On Site in Urban and Suburban Areas
- Commercial Solar Development on Farmlands
- Community Gardens on Private Property as a By-Right or Permitted Use
- Composting in Agricultural, Residential, and Commercial Districts
- Equipment and Composting as Accessory and Temporary Uses
- Farmers Markets in a Variety of Districts
- Fruit Trees in Landscape Requirements
- Keeping Fowl in Urban and Suburban Locations
- Livestock as Accessory Uses, Permitted Uses, and By-Right in Urban and Suburban Areas
- Permit a Broad Range of Urban and Suburban Agricultural Uses By-Right
- Permit the Display and Sale of Fruits and Vegetables on Public Sidewalks
- Prohibit or Limit the Use of Drive-Through Services

223. *Id.* §911.02 (2018).
224. Duluth, Minn., Unified Development Chapter §50-20.3(B)(4)(d) (2020).
225. *Id.* §50-26.4.
226. *Id.* §50-20.3(B)(4)(a).
227. *Id.* §50-20.3(B)(4)(g).
228. *Id.*
229. City of Sacramento, *Table 1—Urban Agricultural Uses*, https://perma.cc/X8WE-Z3F5 (last visited June 2, 2020).
230. Sacramento, Cal., City Code §17.108.170 (2017).
231. *Id.* §17.108.220.
232. *Id.*
233. *Id.* §17.228.810(A).
234. *Id.*
235. *Id.* §17.228.810(B)(1)-(2).
236. *Id.* §17.228.810(C).
237. Orlando, Fla., Code of Ordinances §60.201(a)-(i) (2013).
238. *Id.* §60.202.
239. *Id.* §60.223(a)(2).
240. *Id.*
241. *Id.* §60.223(a)(3).
242. *Id.* §60.223(a)(4).
243. *Id.* §60.223(a)(3).
244. *Id.* §60.223(j).

- Recycled Water Irrigation Systems for New Developments
- Special Use Permits for Agritourism on Farms
- Structures and Fencing as Accessory and Temporary Uses
- Temporary Farm Stands

VI. Creating Incentives

A. *Grocery Store Development in Recognized Food Deserts*

As supermarkets and grocery stores move farther from city centers in an effort to find additional space,[245] food deserts are often left behind. An estimated 23.5 million Americans live in food deserts.[246] Food deserts are influenced by a variety of factors including income level, distance to supermarkets, and vehicle access.[247] Given the diversity among local communities, state and local governments often implement their own methods for designating areas as food deserts.[248] For example, Baltimore, Maryland, designates a food desert as an area in which:

> (i) the distance to a supermarket is more than ¼ mile; (ii) the median household income is at or below 185% of the Federal Poverty Level, as measured by the most recent 5-year estimate of the U.S. Census Bureau's American Community Survey; (iii) over 30% of households have no vehicle available, as measured by the most recent 5-year estimate of the U.S. Census Bureau's American Community Survey; and (iv) the Healthy Food Availability Index average score of all food stores is low, as measured by the Johns Hopkins Center for a Livable Future.[249]

Federal and state governments have adopted several programs to address food deserts so that more people have access to healthy, nutritious food. The federal government, for example, seeks to attract private investment in food deserts through the U.S. Department of Treasury's New Markets Tax Credit Program,[250] while some states have enacted legislation to attract full-service supermarkets to improve the quality of the foods available in food deserts.[251]

One way local governments can help alleviate food deserts is by removing certain barriers in their zoning codes that discourage supermarkets, such as in the examples below from New York City and Philadelphia. Local governments can adopt regulations that give grocery stores different floor-area-ration (FAR) requirements, density bonuses, or height increases to help make development more feasible in certain areas.[252] Regulations can also lower the amount of parking that is required for grocery stores to reduce a developer's costs.[253] Often times these barriers can be incorporated into the definition of grocery store and other areas of the code.[254]

Local governments can also provide less restrictive definitions of permitted stores in order to eliminate as many barriers as possible.[255] For example, Burleson, Texas, allows convenience stores in Neighborhood Service Districts (NS), which are designed to meet the daily needs of the citizens in that neighborhood.[256] Grocery stores are not included in the list of acceptable uses of NS Districts. However, Burleson defines convenience stores as "small neighborhood grocery stores . . . whose purpose is to serve the immediate neighborhood."[257] Defining "convenience stores" in a less restrictive way opens the possibility for small and local stores to provide fresh and healthy food to those living in the surrounding neighborhood.

In addition, local governments can seek to provide tax credits for grocery stores, such as in the example below from Prince George's County. Local codes may include specific definitions in order to target areas that have been designated as food deserts.[258] These specific definitions ensure that tax credits incentivize building in food deserts, while restricting the potential for abuse of the credits. The tax credits can also have set lengths to ensure they are useful in getting the grocery store off the ground, but not overly burdensome on the local government in terms of lost tax revenues.[259]

1. Effects

Overall, removing barriers and incentivizing grocery stores to open in food deserts can improve food security and promote food sovereignty.[260] In so doing, grocery store devel-

245. Brian J. Thomas, *Food Deserts and the Sociology of Space: Distance to Food Retailers and Food Insecurity in an Urban American Neighborhood*, 4 Int'l J. Humanities & Soc. Sci. 1545 (2010), https://perma.cc/F77U-FWEP.
246. *Food Deserts in America (Infographic)*, Tulane Univ. Sch. Soc. Work Blog (May 10, 2018), https://perma.cc/7KE7-Q7VS.
247. *See, e.g.*, Baltimore, Md., City Code art. 28, §10-30 (2017) (listing the factors Baltimore uses to define food deserts for the purpose of administering its Food Policy Initiative).
248. Community Development Financial Institutions Fund, U.S. Department of the Treasury, *New Markets Tax Credit Program*, https://perma.cc/2PLP-Q4QM (last visited June 1, 2020).
249. Baltimore, Md., City Code art. 28, §10-30(3) (2018).
250. *See* Centers for Disease Control and Prevention, *State Initiatives Supporting Healthier Food Retail: An Overview of the National Landscape* (2012) (listing state programs and the types of incentives offered by each).
251. *See* Peter Rosset, *Food Sovereignty: Global Rallying Cry of Farmer Movements*, 9 Backgrounder 1 (2003) (explaining the importance and definition of food sovereignty).
252. New York City, N.Y., Zoning Resolution §63-211 (2009), https://perma.cc/WLN6-AWW8.
253. *Id.* §63-24(c).
254. *See* Fort Collins, Colo., Code of Ordinances §5.1.2 (2019), https://perma.cc/STM3-96JM.
255. *See* Burleson, Tex., Code of Ordinances §54-32 (1983), https://perma.cc/W5KS-HXP3.
256. *Id.* §§75-100, 105(a).
257. *Id.* §50.
258. Prince George's County, Md., Code of Ordinances §10-310(a)(1) (2014).
259. *See id.* §10-311.
260. *See* Rosset, *supra* note 251.

opment can improve the health of the residents in the area. The Food Sovereignty Alliance defines "food sovereignty" as the right to "healthy and culturally appropriate food produced through ecologically sound and sustainable methods," and the right to "define . . . food and agricultural systems."[261] Further, food sovereignty focuses attention on those who "produce, distribute, and consume food," rather than focusing on markets and corporations.[262]

People living in food deserts often lack access to fresh, healthy food which can lead to serious diet-related health problems such as obesity, diabetes, and cardiovascular disease.[263] As a result, people living in food deserts often have a shorter life expectancy than those outside food deserts.[264] Encouraging grocery stores can help local governments deal with these potential issues. Studies have shown that access to a supermarket can lower the obesity and overweight rate of the surrounding area.[265] This is further supported by findings that "higher BMI was significantly associated with living more than a half mile from the nearest grocery store."[266]

Encouraging grocery stores in areas classified as food deserts could also help the local economy. Grocery stores can create local jobs. For example, a "statewide public-private initiative to bring new or revitalized grocery stores to underserved neighborhoods in Pennsylvania . . . created or retained 4,860 jobs in 78 underserved urban and rural communities throughout the state."[267] In addition to providing direct jobs, a new grocery store also supports existing jobs at food suppliers due to increased demand.[268]

As mentioned above, increasing the accessibility of local grocery stores promotes food sovereignty. Local governments and communities are uniquely situated to give market access to local producers and increase local food sovereignty by reducing the number of food deserts. Increasing the availability of grocery stores increases local food sovereignty; providing access to healthy and affordable food in local neighborhoods stabilizes both the community and the food sovereignty system.[269]

In addition to food deserts, food swamps are neighborhoods "where fast food and junk food inundate healthy alternatives."[270] Research on food swamps has shown that increasing the flow of healthy foods into a neighborhood "may be tempered by the continued accessibility of unhealthy foods"—which abound in food swamps.[271] Local zoning ordinances could be used to limit access to unhealthy food while incentivizing healthy food retailers in underserved neighborhoods.[272]

2. Examples

☐*Philadelphia, Pennsylvania.* Philadelphia, in conjunction with the Pennsylvania Fresh Food Financing Initiative, offers a package of zoning incentives through its Fresh Food Market Bonus. To receive these benefits, stores must be designated as fresh food retailers.[273] This means they have a minimum of 1,200 square feet of fresh food market use and the fresh food area must be located on the ground floor while accessible through a separate entrance along the side of the building facing the primary street.[274] Though not confined to food deserts, this program is designed to give residents across the city access to healthier foods by removing zoning barriers that make grocery store development less profitable.

In districts where there are floor area limitations on retail uses, fresh food markets can exceed those limits by up to 50% of the lot area.[275] In zoning districts governed by floor area ratio, buildings with fresh food markets are allowed one additional square foot of floor area for each square foot of area occupied by the market, up to a maximum of 25,000 square feet.[276] For zoning districts regulated by height, a building with a fresh food market may exceed the maximum building height of a zoning classification by up to 15 feet.[277] Throughout the city, the first 10,000 square feet of a fresh food market's floor area is exempt from off-street parking minimums.[278] To view the provision, see Philadelphia, PA, The Philadelphia Code §14-603(7) (2012).

261. Vermont Farm to Plate Food Access Cross Cutting Team's Food Justice Committee, *Approaches Towards Food Access: A Self-Assessment Tool and Resource Tool* (2019), https://perma.cc/7FJ9-U6FK.
262. *Id.*
263. Maryam Abdul-Kareem & David Thornton, *Using Zoning to Create Healthy Food Environments in Baltimore City* 1, 4, 17 (2009), https://perma.cc/54N4-S7UA.
264. *See, e.g.*, *Baltimore Development Corporation, Grocery Store Personal Property Tax Credit*, https://perma.cc/DQX3-RNXN (last visited Dec. 6, 2019) ("Lack of access to healthy food choices contributes to disparities in life expectancy, which can differ up to 18 years.").
265. Kimberly Morland et al., *Supermarkets, Other Food Stores, and Obesity: The Atherosclerosis Risk in Communities Study*, 30 Am. J. Preventative Med. 333 (2006), https://perma.cc/NT2Y-5Z8L.
266. Amy Carroll-Scott et al., *Disentangling Neighborhood Contextual Associations With Child Body Mass Index, Diet, and Physical Activity: The Role of Built, Socioeconomic, and Social Environments*, 95 Soc. Sci. & Med. 106 (2013), https://perma.cc/6XGZ-6VL5.
267. *See* Sarah Treuhaft & Allison Karpyn, *The Grocery Gap: Who Has Access to Healthy Food and Why It Matters* 9 (2010), https://perma.cc/S88K-ANT7.
268. Samuel M. Berman, *The Economic Impact of New Grocery Store Development: Studying the Effects of New Grocery Store Development in Underserved Communities* 17 (2012) (M.S. thesis, Tulane University), https://perma.cc/3P3W-6YXQ.
269. *See generally* Ashley Blackwell, *Best Practices for Creating a Sustainable and Equitable Food System in the United States*, Ctr. for Am. Progress (May 12, 2016), https://perma.cc/F6EK-NJ9P (discussing food deserts in low-income neighborhoods and communities of color).
270. Kristen Cooksey-Stowers et al., *Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States*, 14 Int'l J. Env't Rsch. & Pub. Health art. 1366, at 1-2 (2017), https://perma.cc/7NPR-RKJB.
271. *See id.*
272. Daniel P. Jones, *Food Swamps Predict Obesity Rates Better Than Food Deserts*, U. Conn. Rudd Ctr. (Nov. 14, 2017).
273. Philadelphia, Pa., Code and Home Rule Charter §14-601(6)(d)(.1) (2012).
274. *Id.*
275. *Id.* §14-603(7)(b).
276. *Id.* §14-603(7)(c).
277. *Id.* §14-603(7)(d).
278. *Id.* §14-603(7)(e).

☐*Prince George's County, Maryland*. Prince George's County attempts to address the issue of food deserts through tax credits. The County provides a credit against the real property tax on grocery stores in "grocery store focus areas."[279] In order to ensure the tax achieves the goal of helping solve the food desert issue specifically, the code provides targeted definitions for the tax.[280] In order to be considered a grocery store, a business must primarily sell food to the general public to be consumed off site and 20% or more of the sales must be from fresh produce, meats, or dairy.[281] Additionally, the section defines grocery store focus area as an area designated to be a food desert or a vacant space that was a grocery store, or is part of a well-established shopping center.[282] These definitions allow the County to ensure that the tax credit will not be abused. As for the credit itself, it is set equal to "75% of the amount of property tax imposed on the increased assessment" attributable to expansion of, construction on, or reuse for grocery store purposes.[283] The credit expires after 10 years, or if the business stops grocery operations.[284] To view the provisions, see Prince George's County, MD, Code of Ordinances §§10-310, 10-311 (2014).

☐*New York, New York*. New York City has addressed the issue of food deserts through the New York City Food Retail Expansion to Support Health Program (FRESH), which facilitates "development of FRESH food stores that sell a healthy selection of food products."[285] FRESH benefits are available to stores that are located in pedestrian-oriented local shopping districts in certain neighborhoods throughout the city.[286] FRESH achieves its goal of facilitating the development of grocery stores through a few zoning incentives.

First, the code provides incentives to developers building a FRESH food store. If a store is located within a mixed-use building, the developer may exceed the maximum space for other uses.[287] For example, one additional square foot of residential floor area is allowed for every square foot occupied by the FRESH food store, up to 20,000 square feet.[288] The zoning regulation also allows for an increase in the maximum height of a building by 15 feet, so long as there is a FRESH food store in the first story.[289]

Second, the code can alter parking requirements to make development more affordable. As part of FRESH, stores in certain districts are subject to lower parking requirements, requiring one parking space for every 1,000 square feet of floor area.[290] The City Planning Commission may also authorize separate reductions in required parking if certain conditions are met.[291] To view the provisions, see New York City, NY, Zoning Resolution §§63-00 to 63-60 (2009).

B. *Subdivision Set-Asides for Agricultural Farmland*

Agricultural farmlands are critical for the production of food and the raising of livestock.[292] In addition, they are central to many rural economies.[293] However, farmland across the U.S. is threatened by non-farm development that focuses on residential, commercial, and industrial growth.[294] Since 2001, developers and others have been permitted to convert over 11 million acres of agricultural land to non-farm development.[295] Over 38% of the agricultural land that has been converted is considered "prime farmland".[296] Whenever farmland is converted to non-farm development, potential food production, wildlife habitats, associated ecosystem services, and open spaces are permanently lost as non-farm uses are rarely returned to agricultural uses.[297]

To help stem the loss of farmland, numerous local governments have passed subdivision regulations that seek to reserve land for food production. As part of the subdivision regulations, local governments may require or allow subdivision developers to set aside land for food production—often with incentives such as density bonuses as described below in the examples. Codes can require the developer to include some form of food producing entity (e.g., a farm, orchard, community garden, livestock operation, etc.) in any pre-approved subdivision plan or encourage such inclusion by granting incentives.[298]

A common mechanism to include set-asides is to require subdivisions to cluster development, as described in Part V.A. Cluster development ordinances allow for development on lots when that development is grouped in a smaller section of the lot, leaving space for agriculture or open space. Local governments may offer density bonuses to developers who meet certain criteria regarding how they structure subdivision plats and whether they increase density in some areas while leaving other areas open.[299]

Local governments may also require a deed restriction, easement, or covenant to ensure the open space remains as such or as agricultural land in perpetuity.[300] Alternatively, local governments may require the deed restriction, ease-

279. Prince George's County, Md., Code of Ordinances §10-311(a).
280. *See id.* §10-310.
281. *See id.* §10-310(a)(1).
282. *Id.* §10-310(a)(3).
283. *Id.* §10-311(b).
284. *Id.* §10-311(d).
285. New York City, N.Y., Zoning Resolution §63-00.
286. *Id.* §63-02.
287. *Id.* §63-211.
288. *Id.*
289. *Id.* §63-22.
290. *Id.* §63-24(c).
291. *Id.* §63-50.
292. Ann Dillemuth, Farmland Protection: The Role of Local Governments in Protecting Farmland as a Vital Local Resource 1, 3 (2017), https://perma.cc/ZD4E-TKGR.
293. *Id.*
294. *Id.* at 1.
295. Julia Freedgood et al., American Farmland Trust, *Farms Under Threat: The State of the States* 1, 3 (2020), https://perma.cc/EHK6-HS46.
296. *See* Dillemuth, *supra* note 292, at 1.
297. *See id.* at 1-2.
298. Luke Runyon, *Forget Golf Courses: Subdivisions Draw Residents With Farms*, NPR (Dec. 17, 2013), https://perma.cc/L8Z5-DUTA.
299. *See, e.g.,* Watertown (Jefferson County), Wis., Code of Ordinances §42-123(a).
300. *See, e.g., id.* §42-123(d)(4).

ment, or covenant be granted to a trust or organization to oversee the land.[301] A method to ensure maintenance of the land should be secured before final subdivision approval is granted to developers.[302] To ensure the long-term sustainability of the farmland, local governments should be cognizant of how the lands will be used in the future and who will maintain them.

Some local ordinances broadly define what is permitted in the open space subdivision areas. They do so by redefining terms such as "food production," "agricultural use," or "farm" to allow a variety of uses including community gardens and orchards as well as traditional farming.[303] Finally, these ordinances often address potential nuisance-based actions from neighbors by requiring the agricultural uses to be the least burdensome to the surrounding area.[304] This is particularly important for these ordinances as they are often applicable in the urban-rural divide, where agricultural uses abut residential uses and the potential for nuisance claims exists.

1. Effects

Subdivision regulations that encourage or require the setting aside of land for food production can help mitigate the negative effects stemming from the conversion of farmland to non-farmland. When farmland is converted to non-farm development and when land is re-zoned from agricultural to residential use, the price per acre and property taxes often rise.[305] This makes it difficult for farmers to stay or move to the area and to be profitable.[306] For example, Missoula, Montana, has seen prime farmland converted to non-farmland.[307] Such conversion has increased the cost of land per acre to $150,000.[308] Many local Missoula farmers do not have the financial resources to afford or the ability to make a profit from land purchased at $150,000 per acre.[309] This shift in value when exploring alternative uses provides a significant financial incentive for landowners and developers to subdivide large lots and build residential housing.[310] Regulations that permit subdivisions and encourage the setting aside of land for food production provide an alternative that gives landowners and developers an opportunity to maximize the value of their land, while not losing critical agricultural lands.

Subdivision regulations that set aside land for food production also prevent nuisance issues that could arise between farms and nearby non-farm uses.[311] Residential and agricultural uses can devolve into poor neighbor relations because of the "noise, dust, odors, chemical sprays and slow-moving machinery" utilized in food growing operations.[312] In addition, "farms are subject to trespassing, vandalism, and complaints from nonfarm neighbors."[313] By permitting subdivision regulations that encourage the setting aside of land for farms, individuals purchasing homes in the subdivisions are informed that they are purchasing a home near an active farm. In addition, they may be included in the farm activities, which may reduce nuisance actions.[314]

Setting aside land for food production can also create a sense of connectedness between the surrounding homeowners and the food they consume.[315] By permitting food-producing land in close proximity to residential homes, the community may get a better understanding of where its food comes from. Not only is the surrounding community interacting with the food production process, it may reap the benefits associated with living close to a food source if the farms are producing food that is sold at local farmers markets, farm stands, or through community-supported agriculture (CSA).[316]

Lastly, setting aside land for food production can help revitalize and support local food production. Since 2007, the number of new farmers has decreased about 20%.[317] The combination of subdivision development and preservation of land for food production may help increase or maintain the options available to encourage farming.[318]

2. Examples

☐ *Watertown, WI.* Watertown offers a 42% density bonus to developers who subdivide lots with the purpose of preserving or connecting open space, including agricultural land.[319] Bonuses are eligible in the agricultural or agricultural/residential zones as set out in the town's comprehensive plan.[320] To be eligible, the plot must have a minimum size of 35,000 square feet.[321] No more than 50% of the lot may be developed, and all residential uses such as structures and roads must be within that area.[322] Developed property must be designed so as to minimally disturb the surrounding environment (e.g., wetlands, floodplains, and steep slopes), and all utilities must be buried.[323]

301. *See, e.g., id.*
302. *See, e.g., id.*
303. *See, e.g.,* Fayette County, Ga., Code of Ordinances §110-126(e)(3)-(6) (2012).
304. *See, e.g.,* Watertown (Jefferson County), Wis., Code of Ordinances §42-123(c)(3).
305. *See* Erika Fredrickson, *In Montana, Houses Are Replacing Farmland*, High Country News (Jan. 15, 2018), https://perma.cc/M6NK-6NZR.
306. *Id.*
307. *See, e.g., id.*
308. *Id.*
309. *See id.*
310. *Id.*
311. *See* Lynn Markham, *Farming Subdivisions: Problematic or Promising?*, 7 Ctr. for Land Use Educ. 8 (2007), https://perma.cc/8RRG-6GXH.
312. *Id.* at 9
313. *Id.* at 8.
314. *See id.* at 8-9.
315. *See* Runyon, *supra* note 298.
316. *See, e.g.*, *id.*
317. *Id.* at 2.
318. *See id.*
319. Watertown (Jefferson County), Wis., Code of Ordinances §42-123(a).
320. *Id.*
321. *Id.*
322. *Id.* §42-123(c)(1).
323. *Id.* §42-123(c)(3)-(4).

A deed restriction has to be utilized to prevent both further plat subdivisions and perturbation of the open space.[324] The agricultural layout must also provide maximum protection to surrounding sensitive habitats, with preference given to wetlands, flood plains, and steeply sloped areas.[325] Watertown requires that the open space be "a large scale, single, contiguous, and interconnected block with logical, straightforward boundaries."[326] Ownership of the land must be conveyed to lot owners either by a homeowners association or in fee simple with each owner possessing an equal undivided interest.[327] Alternatively, the land may be conveyed to a land trust or conservation group.[328] Before final approval is given to a plot, a mechanism that ensures maintenance of the food-growing space should be in place.[329] To view the provision, see Watertown, WI, Code of Ordinances §42-123 (2003).

☐ *Larimer County, CO*. In Larimer County, parcels of land larger than thirty acres must cluster residential development onto smaller lots, in part to "protect and encourage [the] continuation of existing agricultural uses."[330] There are three other stated purposes of Conservation Development: maintaining open and rural land, protecting environmentally-sensitive areas, and promoting compatibility with existing land uses.[331]

Accessory structures related to agriculture are allowed so long as they are necessary.[332] The cluster development must be formed so that its design does not compromise the integrity of the agricultural use.[333] The Code encourages flexibility in lot size that is mindful of the site's natural features and topography while accommodating residential uses and housing styles, as well as sizing lots to be compatible with agricultural uses.[334] Developers can utilize building envelopes instead of adhering to setback requirements, but must have a design that avoids hazardous areas, the peaks of ridges and slopes, "view corridors, open fields, sensitive environmental areas, and agricultural infrastructure."[335] If agricultural structures are located outside of building envelopes, such development must be approved and follow relevant setback requirements.[336] To view the provisions, see Larimer County, CO, Code of Ordinances §§5.3.1(B), 5.3.6(B)(1)(C), 5.3.7(A)(4), 5.3.7(B)(3), 5.3.7(C)(1)-(2) (Feb. 3, 2020).

C. Additional Actions Described in the Book

Remarkable Cities and the Security and Sovereignty of Food and Nutrition contains further suggestions aimed at fostering incentives, including:

- Agricultural Lots in Planned Unit Developments (PUDs)
- Green Roofing
- Grocery Stores and Infill Development
- Permit Commercial Agricultural Activities in Urban/Suburban Areas and Allow Them to Satisfy Open-Space Requirements
- Stormwater Management Credits for Providing Agricultural Land or Open Space
- Voluntary Agricultural Land Protection Districts

VII. Filling Gaps

A. Development Restrictions to Protect Prime Soils

Limiting development based on soil quality can preserve and support land suitable for farming, while discouraging other uses on high-quality soil.[337] Every hour, 180 acres of farm and ranch are lost to development for other uses.[338] This equates to over 30 million acres since 1982—about the size of Mississippi.[339] In addition, 1.7 billion tons of topsoil are lost every year through erosion.[340] The American Farmland Trust (AFT) predicts that the U.S. will lose another 6 million acres of viable farmland in the next several years.[341] A significant contributor to the loss of farmland is sprawling and, at times, inefficiently planned housing and commercial development.[342]

Prime soil helps create efficient farmland.[343] The type of soil "composition and breakdown rate affect: the soil structure and porosity; the water infiltration rate and moisture holding capacity of soils; the diversity and biological activity of soil organisms; and plant nutrient availability. Nutrient exchanges between organic matter, water and soil are essential to soil fertility and need to be main-

324. *Id.* §42-123(d)(1).
325. *Id.* §42-123(d)(2).
326. *Id.* §42-123(d)(3).
327. *Id.* §42-123(d)(4).
328. *Id.*
329. *Id.*
330. Larimer County, Colo., Land Use Code §5.3.1 (Feb. 3, 2020), https://perma.cc/6R7V-UZYS.
331. *Id.*
332. *Id.* §5.3.6(B)(1)(C).
333. *Id.* §5.3.7(A)(4).
334. *Id.* §5.3.7(B)(3).
335. *Id.* §5.3.7(C)(1).
336. *Id.* §5.3.7(C)(2).
337. Chester County Planning Commission, *Agricultural Zoning*, https://perma.cc/AVT5-SWHZ (last visited June 21, 2020).
338. Lori Sallet, American Farmland Trust: *2018 Farm Bill a Victory for Farmland Protection, Environmentally Sound Farming Practices and Keeping Farmers on the Land, Am. Farmland Trust* (Dec. 11, 2018), https://perma.cc/G4PW-9NWW.
339. *Id.*
340. Amazing Grass, *No Farms, No Food,* https://perma.cc/63U2-BH4N (last visited May 29, 2020).
341. American Farmland Trust, *Annual Report 2017*, at 3 (2017), https://perma.cc/5Q8V-9RAQ.
342. American Farmland Trust, *Farmland*, https://perma.cc/TCG8-FVNY (last visited June 24, 2020).
343. *See* Natural Resources Conservation Service, *Prime Farmland*, https://perma.cc/WFA2-XNFH (last visited June 21, 2020).

tained for sustainable production purposes. When the soil is exploited for crop production without restoring the organic matter and nutrient contents, the nutrient cycles are broken, soil fertility declines and the balance in the agro-ecosystem is destroyed."[344] Local governments must understand the value of the soil to determine whether to discourage nonagricultural development on prime soils or to preserve the farmland upon which they are situated for agricultural use.[345]

Ordinances seeking to preserve farmland based on the quality of soil can be effective measures to preserve prime soil for agricultural uses.[346] As evidenced by the local government ordinance examples below, such an ordinance generally functions by explicitly limiting the percentage of prime soil or farmland on any lot in a predominantly agricultural district on which nonagricultural development is allowed. Ordinances may also include classifications of which soils are considered prime or unique, and can require developers to explain why they are unable to develop mostly or entirely on land that is non-prime farmland or that is set back from agricultural lands before they are allowed to encroach on prime farmland.[347] To increase the ordinances' effectiveness, some local governments expand the traditional definition of prime soil and farmland to include areas that do not contain prime soils, *per se*, but which "lie within, or are surrounded by contiguous areas" that have prime soils.[348] This helps to preserve the integrity and productivity of farmlands with prime soils nearby.[349]

Another common measure taken to preserve prime soil and its agricultural use is to restrict nonagricultural uses and associated development to a small portion of a lot.[350] This allows "landowners to preserve large pockets of valuable soils"[351] However, on its own, this approach does not necessarily prevent one of the largest concerns associated with urban development on farmland. Namely, it does not prevent the misuse of prime soil. Development may still occur within prime soil areas, resulting in the loss of efficient farmland. Supplementing zoning ordinances with explicit regulations concerning the amount of prime soil that is allowed on a development site ensures prime soil is saved for its best use. Such an approach may also be supplemented with an ordinance limiting soil compaction.[352]

Enacting a prime soil ordinance may limit the amount of development on prime farmland. Reducing development on farmland with prime soil can help maintain those areas that are most efficient and suitable for agricultural use. Limiting development in this way may help the economic viability of farms.[353] Finally, open space will be preserved and urban sprawl will be limited, as soil composition will prevent large scale development from encroaching on prime farmland. This encroachment might not be stopped by more conventional zoning ordinances.

An additional option for local governments to preserve prime soil is the enactment of ordinances focused on mitigation. Such ordinances seek to "mitigate the loss through the purchase or donation of easements providing permanent protection from development on [other] land with comparable soils" within a reasonable distance of the development site.[354] This can be similar to a Purchase of Development Rights program, focused on soil conservation.[355] Alternatively, local governments can require direct offsets.

Like many ordinances, to make sure there is not a regulatory takings issue with such an ordinance, local governments must be careful to leave some economically reasonable use of a property in question and/or comply with specific jurisdictional requirements concerning regulatory takings. Finally, in conjunction with these ordinances, local government may seek to provide additional regulations to ensure the health of the soil. While these ordinances may protect soil health from development, they do not address soil health as impacted by a variety of agricultural practices and do not encourage regenerative or sustainable practices that optimize soil health, such as no-till, cover cropping, and perennial cropping systems.

1. Effects

Prime soil and farmland are threatened by the continuing spread of urban sprawl and continual developer demand for new land.[356] As more undeveloped land is sought by developers, farmland containing prime soil becomes valuable for the sake of its open space and for other qualities that often make such soil more desirable for construction purposes.[357] Though it may not be considered the most efficient use of the land, this has not historically held developers back, and

344. Food and Agriculture Organization of the United Nations, *Healthy Soils Are the Basis for Healthy Food Production* (2015), https://perma.cc/29AQ-AVMX.
345. *See generally* Natural Resources Conservation Service, *Soil Data Access (SDA) Prime and Other Important Farmlands*, https://perma.cc/8QKX-TVBT (last visited June 21, 2020).
346. University of Denver Sturm College of Law, *Food Production and Security* 4, https://perma.cc/FZE4-4K76 (last visited June 21, 2020).
347. Chester County Planning Commission, *Zoning Ordinance: Article IV. AG-Agricultural District*, https://perma.cc/LMQ2-RDT8 (last visited June 23, 2020).
348. A.D. Carver & J.E. Yahner, *Defining Prime Agricultural Land and Methods of Protection* (1996), https://perma.cc/CGX5-V228.
349. *Id.*
350. David Kruft, Agricultural Law Resource and Reference Center, Pennsylvania State University Dickinson School of Law, *Agricultural Zoning* 4 (2001), https://perma.cc/23YS-VVFT.
351. *Id.*
352. For ordinances discussing this, see Sustainable Development Code, Reduce Soil Compaction During Construction, https://sustainablecitycode.org/brief/reduce-soil-compaction-during-construction-3/.
353. Carver & Yahner, *supra* note 12.
354. U.S. Green Building Council, *Agricultural Land Conservation*, https://perma.cc/8LP9-T7WT (last visited June 20, 2020).
355. To find out more about such programs generally, see Sustainable Development Code, Purchase of Development Rights, https://sustainablecitycode.org/brief/purchase-of-development-rights/.
356. Carver & Yahner, *supra* note 348.
357. Marc L. Imhoff et al., *Assessing the Impact of Urban Sprawl on Soil Resources in the United States Using Nighttime "City Lights" Satellite Images and Digital Soils Maps*, U.S. Geological Survey, https://perma.cc/CH38-HA9C (archived on Dec. 11, 2019).

without local government protections, such prime farmland will continue to be lost.[358] With the land utilized for development, the community loses the benefits, economic and otherwise, of the land itself, such as food production, open space, and associated ecosystem services.[359]

In addition, soils are crucial to providing healthy food. "Food availability relies on soils: nutritious and good quality food and animal fodder can only be produced if our soils are healthy living soils. Over the last 50 years, advances in agricultural technology and increased demand due to a growing population have put our soils under increasing pressure. In many countries, intensive crop production has depleted the soil, jeopardizing the soils productive capacity and ability to meet the needs of future generations."[360]

Urban development of prime soil areas can have significant impacts. For example, in Indiana an estimated 20.2 million acres were under the control of farmers in 1950.[361] Since then, there has been a loss of nearly 5 million acres, part of which is attributable to non-farming development.[362] Data covering the entire U.S. shows that development has increased in areas containing soil with few or no limiting factors, with slightly higher rates on land with second-best rated soil (still very farmable soil) compared to areas with the very highest rated soil.[363] Developers appear to be choosing this land for development.[364] In areas with soil that generally is not highly rated, such as California, developers still appear to be choosing areas with soil that is comparatively highly rated for that area.[365]

The obvious effect of this is the loss of farming potential for those lands.[366] In addition, the indirect effect on the remaining agricultural uses in the area is also detrimental. As the number of nonagricultural uses in an area increases, complaints against agricultural uses increases.[367] And, with this increase in disruption, come rules and regulations (and potentially nuisance lawsuits) to reduce the impact of the agricultural uses on non-farming residents and businesses.[368] As new nonagricultural uses are brought into the area, not only is farmland with prime soil developed away from agricultural uses, but the remaining agricultural uses are stifled to lessen their impact on the newer urban development. As the area becomes less agricultural, there is also the potential for increasing the chance that the agricultural use will be deemed unsuitable for the location through nuisance law.[369] This puts the economic viability of farming in jeopardy, which is problematic for states where agriculture is a vital part of the economy.[370]

2. Examples

☐*Whitman County, Washington.* The Whitman County, Washington, zoning code has a provision that allows for the development of residential areas within its Agricultural District.[371] As opposed to developing on a single lot, these Planned Residential Developments would create large, multi-lot residential developments that take advantage of the natural features of the area.[372] Not only are these developments intended to highlight and utilize the natural features of the site, but they are also intended to provide additional protection for the natural habitats in the area.[373]

These Planned Residential Developments are a special conditional use within the district.[374] As such, they are subject to a variety of requirements in order to receive approval from the board.[375] One of these requirements restricts the amount of prime farmland that can be present on a development site.[376] A Planned Residential Development cannot have more than 25% of the proposed parcel classified as prime farmland.[377] The ordinance goes on to define prime farmland as land that has a consistently above average crop yield.[378] In addition to placing a limit on the amount of prime farmland that may be present at the site, the ordinance also requires that the soil at the site be comprised of at least 51% non-tillable soil types.[379] With this restriction in place, Whitman County preserves its best farmland from development, while encouraging and accelerating the development of land that has less agricultural value. To view the provision, see Whitman County, WA, Code of Ordinances §19.10.110 (2015).

☐*Clinton County, Indiana*. Clinton County, Indiana, has adopted a zoning ordinance that limits the amount of prime soil on a development site. The relevant ordinance applies to development in A-1 districts, that is, districts where the predominant usage of the land is agricultural in nature.[380] Furthermore, agricultural land use will be favored above other uses, with conflicting uses discouraged.[381]

Dwellings in the A-1 district use a point system to determine approval.[382] The relevant factors are listed in a chart, along with the associated positive or negative scaled score. For example, as large lots are encouraged for agricultural use in these districts, parcels with 20 to 39 acres receive four points.[383] Plans that fall below ten points total must appeal to the Zoning Board of Appeals in order to receive approval.[384] Clinton County classifies its soil types, with

358. *Id.*
359. *Id.*
360. Food and Agriculture Organization of the United Nations, *supra* note 344.
361. *Id.*
362. *Id.*
363. Imhoff et al., *supra* note 357.
364. *Id.*
365. *Id.*
366. Carver & Yahner, *supra* note 348.
367. *Id.*
368. *Id.*
369. *Id.*
370. *Id.*
371. Whitman County, Wash., Code of Ordinances §19.10.110(A) (2015).
372. *Id.*
373. *Id.* §19.10.110(A)(4).
374. *Id.* §19.10.110(B).
375. *Id.*
376. *Id.* §19.10.110(B)(2).
377. *Id.* §19.10.110(B)(2)(a).
378. *Id.*
379. *Id.* §19.10.110(B)(2)(b).
380. Clinton County, Ind., Unified Development Ordinance §302.01 (2015).
381. *Id.*
382. *Id.* §513.01.
383. *Id.* §513.01, tbl. I-1.
384. *Id.*

non-prime soil classified as permitted to build on, and with prime soil requiring additional approval for construction.[385] With their scoring system, the greater the percentage of permitted soils that are present on the development lot, the more points the plan receives.[386] Land that only has 25 percent of permitted soil or less and a high percentage of protected soil receives zero points, while land with a low percentage of protected soil receives three points.[387] Though the protected soils are not all considered prime soils, prime soils are included in the protected categories.[388] To view the provisions, see Clinton County, IN, Unified Development Ordinance §§302.01, 513, & app. A (2015).

B. *Limit the Density of Dollar and Small Box Discount Stores in Food Deserts and Food Swamps*

An eroding middle class and post-2008 recession spending habits have contributed to the meteoric rise of "dollar stores" across the U.S.[389] Since 2011, the major dollar store chains, such as Dollar General (approximately 16,100 stores), Dollar Tree (approximately 7,200 stores), and Family Dollar (approximately 9,400 stores), have seen a 50% increase in the number of retail locations throughout the country.[390] Dollar stores often target low-income neighborhoods,[391] and are beginning to be viewed as a contributing factor to the entrenchment of poverty in low-income communities rather than a mere byproduct of their existence.[392] Access to fresh meats, fruit, and vegetables is cut off in areas saturated by dollar stores, which do not traditionally offer fresh food as a purchasing option.[393] The food selection they do offer does not foster good health and is often packaged in smaller quantities, so that despite a lower "sticker price" for the same brand of an item, customers end up paying more as measured by per unit costs.[394] In urban and rural communities alike, dollar stores are driving out vendors that provide residents access to healthy nutrition.[395]

Local regulations that target dollar stores are cropping up across the south, where the stores are most densely located,[396] and are beginning to spread to other areas that view them as problematic.[397] Some communities have passed ordinances to address dollar stores by restricting their concentration in a given area, typically not allowing another site with the same use to be within one mile of each other, as measured by a straight line at each property's boundary line.[398] Codes will often refer to these retail uses as "dollar store," "small box discount store," and "small box variety store." Floor areas in these properties must typically be under a range of square footage from 10,000-15,000 feet.[399]

These ordinances also often contain exemptions for unintended uses that might fall within the ordinance's ambit, such as pharmacies and gas stations.[400] Ordinances usually carve out another exemption for sites that use a certain percentage of floor space to sell fresh meat and produce.[401] There is some variation across jurisdictions as to the method by which to apply these regulations. Some areas apply a unilateral ban[402] and others take a district-by-district approach.[403] Other localities utilize overlay zones, which keep the base district's regulations intact but add special rules to areas where the overlay applies.[404] Lastly, some jurisdictions require a special or conditional use permit, where developers have to apply for approval from a local authority to site a dollar store, and will only be approved if certain criteria are met, such as making fresh produce available for sale.[405]

1. Effects

Dollar stores have the potential to siphon business away from traditional grocers while discouraging development of retailers selling fresh food.[406] Stores have a difficult time competing with dollar store formats because overhead costs are much lower at dollar stores, particularly in the areas of staffing and security.[407] Sales at small town grocery stores can drop as much as 30% upon the arrival of dollar store competition.[408] Grocers in districts heavily populated by dollar stores can find it difficult to gain a strong and loyal customer base when dollar stores are heavily concentrated in an area, spreading customers among the many options.[409] Dollar stores can also create negative net employment in

385. *Id.* app. A, tbl. J.
386. *Id.* §513.01, tbl. I-1.
387. *Id.*
388. *Id.* app. A, tbl. J; *see* Natural Resources Conservation Service, *supra* note 345 (select "Indiana" from the first dropdown box, and then "Clinton County" from the second).
389. Emily R. Hernandez et al., City Planning Commission, *Small Box Retail Diversity Study: City of New Orleans* 18 (2018), https://perma.cc/FNL6-EYNE.
390. Institute for Local Self-Reliance, *Dollar Store Impacts* 1 (2018), https://perma.cc/ZY9Z-5YRN.
391. Hernandez et al., *supra* note 389, at 19.
392. Institute for Local Self-Reliance, *supra* note 390, at 1.
393. Jennifer Faubion, *Food Deserts and Dollar Stores*, ArcGIS StoryMaps (Jan. 14, 2020), https://perma.cc/KX8A-LKMK.
394. *Id.*
395. *See* Institute for Local Self-Reliance, *supra* note 390, at 1; Allison Aubrey, *Dollar Stores and Food Deserts*, CBS News (Dec. 8, 2019), https://perma.cc/Y6PE-2F96.
396. Hernandez et al., *supra* note 389, at 18.
397. Charlie Thaxton, *More Cities Pass Laws to Block Dollar Store Chains*, Inst. for Local Self-Reliance (Sept. 26, 2019), https://perma.cc/2PCE-3WED (noting Cleveland is planning to restrict dollar store sites).
398. *See, e.g.,* Tulsa, Okla., Code of Ordinances §42.20.060(B).
399. *See, e.g.,* College Park, Ga., Code of Ordinances app. A §§1.4, 3.1.
400. *See, e.g.,* Atlanta, Ga., Code of Ordinances pt. III, §16-29(87) (1995), https://perma.cc/A6GW-UYQN; Wyandotte County—Unified Government, Kan., Code of Ordinances §27-340 (2019).
401. *See, e.g.,* Wyandotte County—Unified Government, Kan., Code of Ordinances §27-340.
402. *See, e.g.,* College Park, Ga., Code of Ordinances app. A, §§1.4, 3.1.
403. *See generally* Atlanta, Ga., Code of Ordinances.
404. *See, e.g.,* Tulsa, Okla., Code of Ordinances §42.20.060.
405. *See, e.g.,* Mesquite, Tex., Code of Ordinances app. C, §3-510(D).
406. Hernandez et al., *supra* note 389, at 33.
407. *Id.*
408. Institute for Local Self-Reliance, *supra* note 390, at 1.
409. *See id.*

some circumstances because they create fewer jobs than the businesses they replace.[410]

There are some indications that the dollar store business model, with high volumes of cash transactions and low security and staff, can lead to an increase in crime.[411] For example, in 2017, 18 Family Dollar locations were the targets of 32 armed robberies in Dayton, Ohio, alone.[412] Over 200 instances of gun violence have been documented at Family Dollars and Dollar Generals since the start of 2017 with almost 50 deaths resulting therefrom.[413]

2. Examples

☐*Tulsa, OK*. Tulsa has established Healthy Neighborhood Overlay (HNO) districts to promote a broader range of retail choices and increase the availability of fresh meat and produce within the overlay zones.[414] Through the use of these overlay zones, Tulsa seeks to decrease the per-capita frequency of small box discount stores within the district's boundaries, while encouraging community-oriented solutions regarding fresh meat availability, fresh produce availability, and distribution and purchasing options. The city also provides support for investors to develop different options for residents to attain fresh meat and produce through grassroots methods and more diversity in retail stores.[415] The city defines small box discount stores as a retail use with a floor area of less than 12,000 square feet which sells a "variety of convenience shopping goods and consumer shopping goods," in addition to offering a majority of those items at a price of $10 or less.[416] Provisions of the ordinance apply to all new uses, structures, building alterations, and modifications to sites that developers would need to obtain a building permit to execute.[417]

Small box discount stores not exempted in the overlay zones must be separated from one another by a distance of one mile as measured by a straight line from each of the properties' nearest boundary line to the other.[418] The Code exempts traditional pharmacies, gas stations, and grocery stores, as well as any use where 500 square feet of the site is dedicated to the sale of fresh meat and produce, from these requirements.[419] Community gardens are allowed and are also able to sell produce on site within HNO zones (for the SDC's brief specifically discussing community gardens, see Community Gardens on Private Property as a By-Right or Permitted Use (p. 41)).[420] Grocery stores are incentivized in HNOs by reducing the parking requirements for their sites by 50%.[421] Tulsa retains the ability to waive the distance requirement in some circumstances if approval is granted to a small box discount store developer that has been granted an exception through the city's "special exception approval process."[422] To view the provisions, see Tulsa, OK, Code of Ordinances §§42.35.050(L)(4), 42.20.060 (current through 2020).

☐*Wyandotte County, KS*. Wyandotte County defines dollar stores as "small box variety stores" with surface areas equal to or less than 15,000 square feet that sell items such as food and beverages designed for consumption off premises, household goods, grooming or health products, and "other consumer goods."[423] Gas stations, pharmacies, sites where 15% of the area is used for "fresh or freshly frozen food," and sites where food comprises less than two percent of total shelf space are not regulated as small box variety stores.[424] "Fresh and freshly frozen food" is defined as food made for consumption by humans that has not been processed or is still in a raw state and food that has been frozen while fresh (unprocessed meats or seafood qualify).[425] Small box variety stores may only be established upon receipt of a special use permit regardless of what district they are sited in.[426]

In certain business, commercial, and industrial districts, additional regulations apply.[427] For example, small box variety stores cannot be located within 10,000 feet of one another, nor can they be located within 200 feet of a property used as a single-family, two-family, town home or apartment residence.[428] Measurements are to be made from property line to property line for each relevant use category.[429] The Code contains a grandfather clause for sites that have been in operation continuously under the same business name since the passing of the ordinance.[430] To view the provisions, see Wyandotte County—Unified Government, KS, Code of Ordinances §§27-340, 27-593(b)(21) (2019).

☐*Mesquite, TX*. Mesquite's Code refers to dollar stores as "variety stores," and defines them as "a retail store that sells a wide variety of relatively small and inexpensive items."[431] Variety stores are a prohibited use if another variety store is within 5,000 feet of a site.[432] If a site is more than 5,000 feet away, variety stores are allowed only upon receipt of a Conditional Use Permit (CUP).[433] In addition to regulating matters such as nuisance and parking minimums, to obtain

410. *Id.* at 2.
411. Alec MacGillis, *How Dollar Stores Became Magnets for Crime and Killing*, ProPublica (June 29, 2020), https://perma.cc/4PTJ-JWFG.
412. *Id.*
413. *Id.*
414. Tulsa, Okla., Code of Ordinances §42.20.060(A).
415. *Id.* §42.20.060(A)(1)-(5).
416. *Id.* §42.35.050(L)(4).
417. *Id.* §42.20.060(B).
418. *Id.* §42.20.060(D).
419. *Id.* §42.20.060(C)(1)-(3).
420. *Id.* §42.20.060(E).
421. *Id.* §42.20.060(F).
422. *Id.* §42.20.060(D).
423. Wyandotte County—Unified Government, Kan., Code of Ordinances §27-340.
424. *Id.*
425. *Id.*
426. *Id.* §27-593(b)(21).
427. *Id.*
428. *Id.* §27-593(b)(21)(a)(1).
429. *Id.*
430. *Id.*
431. Mesquite, Tex., Code of Ordinances app. C, §6-102 (1998).
432. *Id.* app. C, §3-510.
433. *Id.* app. C, §3-510(C).

a CUP, the use at issue must not be detrimental to either of adjacent uses or adjacent property values, nor can it hinder "the normal and orderly development and improvement" of adjacent property.[434] Considerations specific to variety stores include whether granting a CUP will negatively affect the development of any business that would sell "fresh and healthy food items," such as grocery stores[435]; whether the area is a food desert as defined by the U.S. Department of Agriculture[436]; the availability of fresh food in the area[437]; and the effect the proposed use would have on the "retail food environment index as defined by the Centers for Disease Control and Prevention."[438] Developers who receive a CUP for a variety store must use 10% of their floor space for "fresh produce, meat and dairy products."[439] To view the provisions, see Mesquite, TX, Code of Ordinances app. C §§3-510, 5-303(B), 6-102 (2018).

C. Additional Examples

Further suggestions aimed at addressing gaps are explored in *Remarkable Cities and the Security and Sovereignty of Food and Nutrition*, including:

- Agrarian Trusts and Right of First Refusal
- Concentrated Animal Feeding Operation Regulations
- Cost of Services Studies for All Developments in Agricultural Areas
- Create Urban Growth Area
- Establish Urban Service Area
- Offsetting Agricultural Land Loss Stemming From New Development
- Protection of Pollinators From Habitat Loss and Chemical Exposure
- Rainwater Harvesting
- Setbacks and Buffers Between Non-Agricultural and Agricultural Areas
- Setbacks Protecting Sensitive Habitats and Water Quality

VIII. Conclusion

Nationwide, there is evidence of positive changes happening at the local level in the regulation of development. *Remarkable Cities and the Security and Sovereignty of Food and Nutrition* sets forth 41 recommendations, six of which were dicussed above, to help facilitate local action to increase food and nutrition security and sovereignty. These recommendations are presented as options for more than 36,000 U.S. local governments. Obviously, not all recommendations are relevant to all jurisdictions. Important for food and nutrition security and sovereignty, the decision to adopt a recommendation should be a community, bottom-up one.

As public awareness grows about the problems facing us, we hope communities can find new and creative ways to solve challenges around the food system. Most of all, we hope communities can be inspired to take positive steps to change the way we develop.

434. *Id.* app. C, §5-303(B)(1)-(5).
435. *Id.* app. C, §3-510(C)(1).
436. *Id.* app. C, §3-510(C)(3).
437. *Id.* app. C, §3-510(C)(2).
438. *Id.*; Centers for Disease Control and Prevention, *Census Tract Level State Maps of the Modified Retail Food Environment Index (mRFEI) (2012)*, https://perma.cc/ZAW2-HSCL (describing "mRFEI" as a metric assessing the availability of healthy foods in a community).
439. Mesquite, Tex., Code of Ordinances app. C, §3-510(D).