

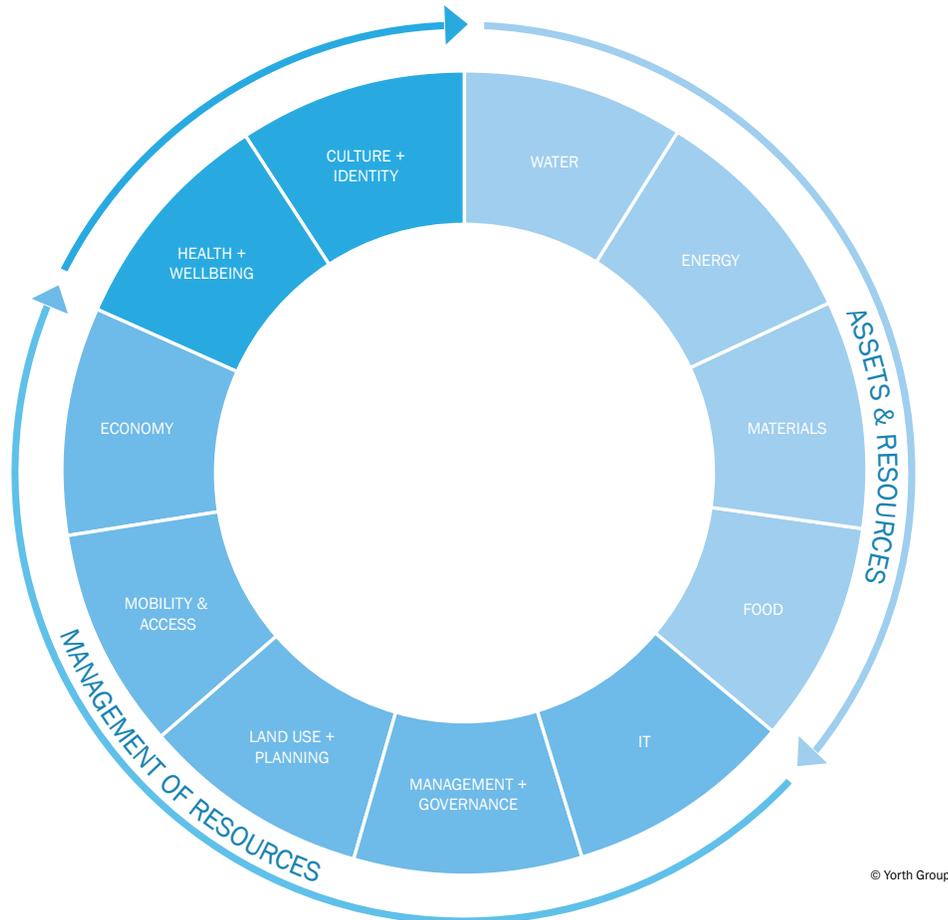
FOOD

closing the loop



Restorative Development: Full Resource Integration to Power a New Local Economy

To assess performance, Yorth uses its proprietary Restorative City Standard™. The Standard has 11 performance areas, each with goals and key performance indicators (KPIs). When these are managed systematically and synergistically, net-positive results can be achieved.



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As shown, the performance areas create a virtuous cycle of positive action. Effectively integrating physical resources such as energy, water, and materials in closed-loop systems creates economic, social and environmental benefits. This attracts new investments, industries and employment opportunities. If managed according to restorative standards, this new local economy improves residents' quality of life, which in turn strengthens culture and identity.

Through its integrated approach, restorative development generates the following outcomes:

- Resilient and climate-proof infrastructure
- Zero-emission energy, water, materials and food infrastructure
- Energy, food and water security
- Resilient and green local economy with new jobs and career pathways
- Incentives for local developers and industries
- Increased economic, social and environmental equity across all sectors

SUMMARY

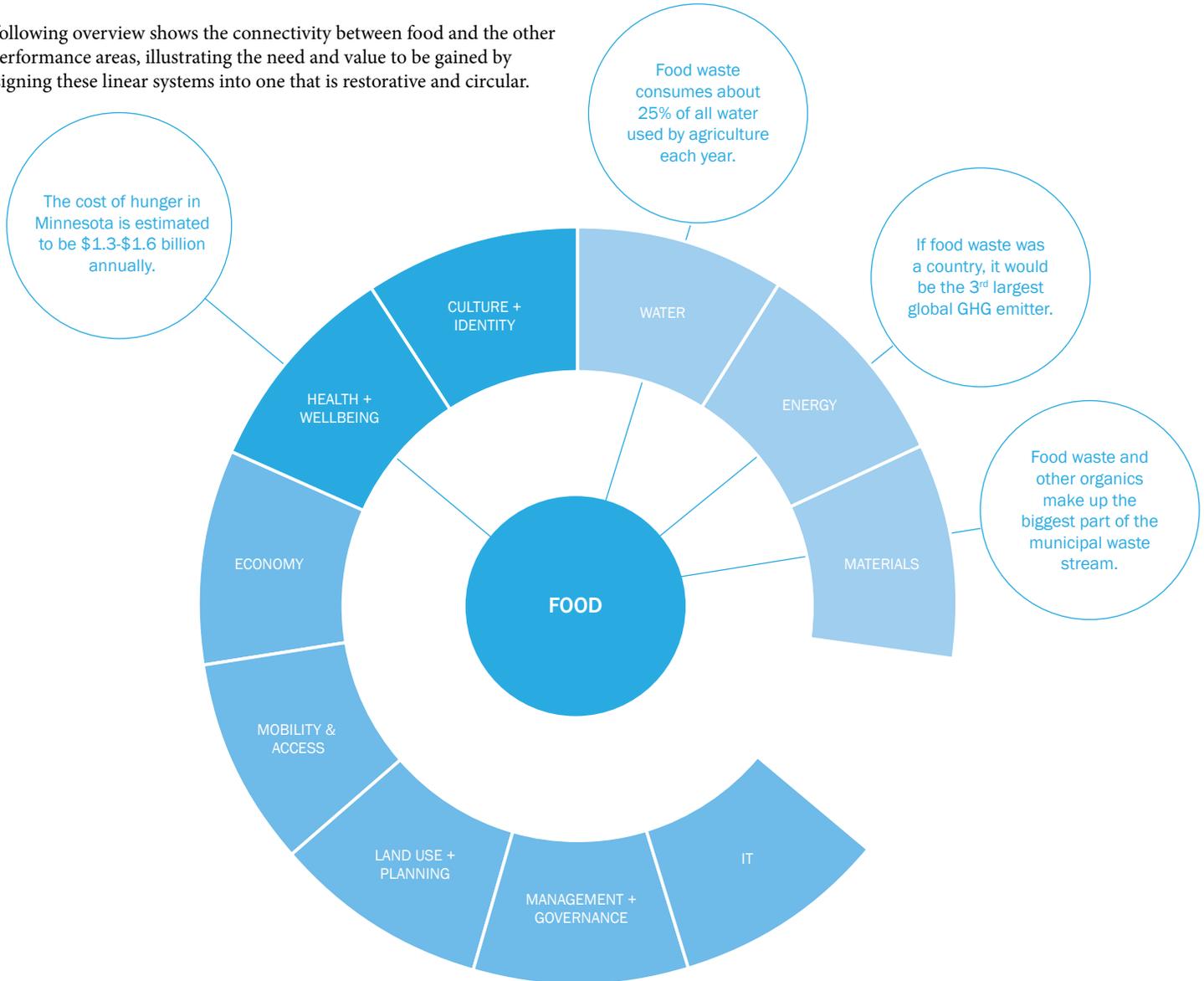
FROM

A global system of misallocated resources

TO

Local and sustainable food systems

The following overview shows the connectivity between food and the other ten performance areas, illustrating the need and value to be gained by redesigning these linear systems into one that is restorative and circular.



KEY TAKEAWAYS

- Food is part of a heavily specialized and centralized system which achieves high efficiencies within silos, but causes significant externalities and misallocation of resources at system scale.
- While solving hunger is not as easy as simply reallocating food that would otherwise go to waste, it is useful to know that the annual retail value of food waste (\$160B) almost equals the annual costs of food insecurity in the United States (\$162B).
- Cities will have to play an important role in future food supply. However, the only way to do so economically is a wholly integrated approach with water, energy and materials management.

FOOD

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Whether it's a trip to the supermarket, or a click on a delivery app, at no other time in history has it been easier to get food on the dinner table for so many people. Yet the simplicity of purchase belies the hidden complexity of the food system.

Paradoxically, food is so cheap that we can collectively afford to waste a third of it, yet it costs so much that 37 million Americans continue to struggle with food insecurity even during a decade of economic growth. With every food item traveling an average of 1500 miles¹ before being consumed, the economics of food remain somewhat of a mystery to the average consumer, whose lunch salad is more likely to be shipped from California—a state suffering from a water crisis—than from their home state.

Given the myriad of externalities that the industrialized food system produces—emissions, soil depletion, antibiotic resistance, to name just a few—putting a number on the true cost of food remains difficult. A popular symbol of a food item that is priced too low when considering the environmental, social, and economic externalities is the hamburger. To price these externalities, estimates from different sources range from an extra \$1.52 per burger² (taking into account the embedded water, greenhouse

gases, and future health care costs) to \$200 for a burger, if the cattle was raised on cleared rainforest land³.

If the food system is global, and most policies are national, the impact is most acutely felt at the regional level, whether it's school lunch policy to mitigate child hunger, the impact of chronic diseases, or a city's resilience and local infrastructure's ability to supply food in the face of catastrophic events.

Restorative development calls for a future where food is affordable for all, yet externalities are fully accounted for. With the rise of urban agriculture, cities are in a unique position to model closed-loop, waste-free food production methods that can serve as local economic engines, increase health and wellbeing, and add resilience. In order to make the case for investment, it's important to examine the cost of food insecurity, the cost of food waste, and the role that localized, closed-loop production can play in alleviating both.

1. Food in Minneapolis and Minnesota

1.1. System Characteristics & Existing Infrastructure

Minneapolis—and the entire state of Minnesota—are deeply embedded in the national and international food system. Data is scarce on how much food is grown and consumed in-state, and how much food is imported from other states or countries.

In the United States, Minnesota ranks 5th in agriculture production, with corn (26%) and soybean (19%) the largest commodity shares, followed by hogs (15%), cattle (12%), and dairy (10%). Minnesota exports 40% of its agricultural production nationally and internationally. With much of the state’s production going to either animal feed or exports, the food that ends up on Minnesotans’ plates is largely imported, much of it from abroad, in line with national consumption patterns. According to the Federal Food and Drug Administration, 15% of the U.S. food supply is imported, including almost 95% of seafood, more than half of fruit, and one-third of vegetables.⁴

Seen through a more localized lens, the following picture emerges for food supply in and around the City of Minneapolis. At the county level, hypothetically, a ton-to-ton comparison reveals that Hennepin County could supply 27% of the food demand in Minneapolis. Of the 54,284 acres currently farmed in Hennepin County, 86% of outputs are corn and soy, 9% are eggs, and 4% are vegetables and fruits.⁵

In 2019, there were almost 30 farmers’ markets in Minneapolis, drawing 2.4 million visitors.⁶ Collectively, vendors farmed 11,200 acres and food traveled an average of 38 miles from farm to market.⁷ In addition, there were 295 community gardens in 2017 for cultivation at the neighborhood level.⁸

The City of Minneapolis is one of more than 170 cities that have signed on to the Milan Urban Food Pact, which includes a focus on increasing local food production in urban and peri-urban areas. As part of the creation of the forthcoming Food Action Plan, the city is currently exploring these goals, amongst others:

- Increase (double in 5 years) the overall amount of sustainably produced “local” urban agriculture in ways that help achieve multiple community-wide outcomes (environment, health, well-being, local food economy.)
- Decrease (by 50% in 5 years) the population without access to urban agriculture within the city (with attention to food justice, climate justice, economic inequalities & health disparities.)

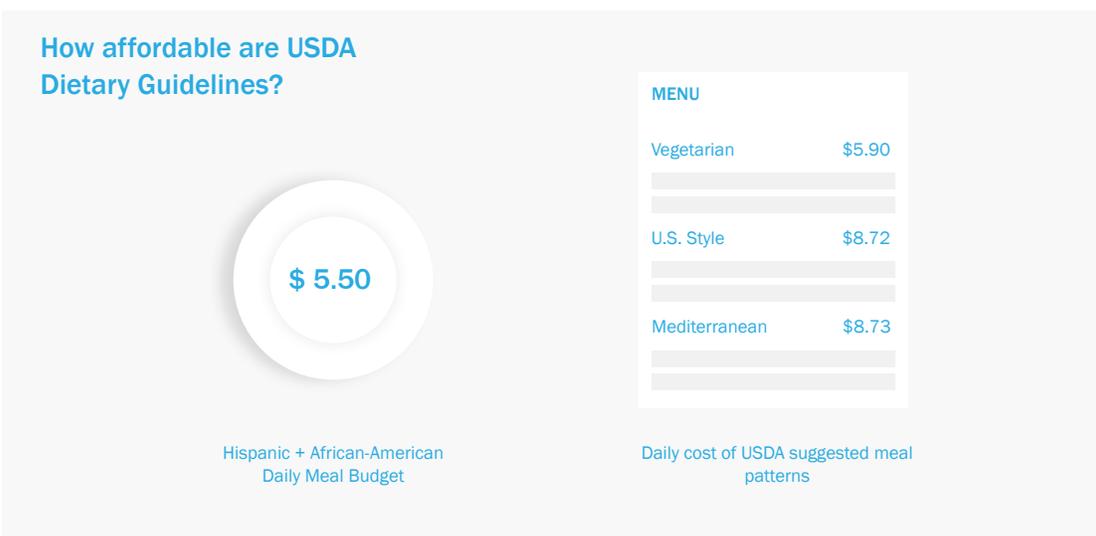
1.2 Rates & Affordability

Despite being a top agricultural producer, Minnesota ranks amongst the top 10 U.S. states with the lowest retail access to food. Based on the distance to their closest grocery store, 30% of Minnesotans have low retail access to healthy food, especially in rural areas—for many, living in farm country does not equal easy access to fresh produce.

In the Twin Cities, almost one million people live more than a mile from retail access to food.⁹ In the City of Minneapolis, there are 11 Federally Designated Food Areas, with communities with a high percentage of people of color, such as Near North (86%) and Camden (56%) being particularly affected by the lack of access to food.¹⁰ However, an even bigger barrier to healthy food consumption is cost. Poor health outcomes are more strongly linked to poverty than to distance to a healthy food retail store.¹¹

While it is not impossible to eat healthy on a budget, highly processed foods with high caloric density can seem to be the more cost-effective choice, even as they lack nutritive value. In general, grains and sugar food groups are cheaper than vegetables and fruits per calorie.

A 2019 study examined the three Healthy Food Patterns identified by the US Department of Agriculture (USDA) to implement its dietary guidelines for Americans, and found significant cost differentials compared to what many households are actually able to spend on a meal. The cost of existing diets was \$5.47 a day for Hispanics, \$5.48 a day for African-Americans, \$5.94 a day for whites and \$6.57 a day for Asians. By contrast, the recommended meal patterns suggested by the USDA are as follows: the US-style Pattern costs \$8.27/d, the Vegetarian Pattern costs \$5.90/d, and the Mediterranean Pattern costs \$8.73/d. Further, the Healthy Food Patterns featured some of the recommended food groups in unrealistic amounts, increasing soy by 1600% in the vegetarian pattern, for example. Such deviations from commonly accepted eating behaviors further complicate the uptake of the guidelines by the population.¹²



Urban Agriculture: Why It Matters

The future of food is a question of global scale. According to the World Resources Institute, if we continued the status quo of our existing global food system, there will be a 56% production gap to feed the projected 10 billion people that will live on our planet in 2050. We would need land nearly twice the size of India in addition to the land we already use to close this gap. On the other hand, if we reduced the amount of meat and dairy that we consume and the food we waste by a half, then we can feed the world 80% organically without increasing the amount of farmland currently used.





Which one of these two scenarios will materialize will largely depend on how cities, home to the majority of the world's population, chose to respond at their local scale. Making the reduction of food waste a priority, increasing the land available for urban farming (including the reuse of buildings for indoor production), and investing in regenerative practices are some of the tools available for cities to lead this transition. While urban farming alone is not a panacea to the myriad of problems inherent in the centralized and industrialized food system, it can add resilience, access to healthy foods, and community wellbeing to cities, as well as deepen a sense of shared purpose and identity.

2 Food: A Tale of Misallocated Resources

According to the latest data available from the USDA, in 2018 more than 37 million people in the United States lived in food-insecure households, including more than 11 million children.¹³ The USDA defines food insecurity as “lacking access to enough food for an active, healthy life for all household members at least some time during the year.” In 2018, levels of food insecurity declined to the pre-recession (2007) level of 11.1 % of all households only for the first time, indicating that the effects of the Great Recession could be felt in American households for over a decade.¹⁴ Estimates of total direct and indirect 2014 health-related costs attributable to food insecurity amount to \$160 billion annually in the United States.¹⁵

In 2017, 128,620 residents in Hennepin County were food insecure (10.4% of the population), of which 34,160 were children (12.6% of children¹⁶). At a cost of \$3.43 a meal, Feeding America estimates there is a collective food budget shortfall of \$75 million per year.

Although food insecurity rates in Hennepin County and in Minnesota have both been trending downwards while consistently being lower than the national average over the past decade, visits to food shelves tell a different story. According to an analysis of state data by Hunger Solutions, the number of Minnesotans using food shelves hit a record high in 2017 with 3,402,077 visits, making 2017 the seventh consecutive year of more

than 3 million yearly visits.¹⁷ Both at a local and national level, even as unemployment has fallen, and before the COVID-19 pandemic, households have begun using emergency food assistance programs as a regular way to meet their food needs. This

indicates that for many, wages are not enough to cover all basic needs, such as food. One study estimates that in the United States, more than 53 million people—44% of all workers aged 18-64—are low-wage workers, earning median hourly wages of \$10.22 and median annual earnings of \$17,950. In the Minneapolis-St. Paul-Bloomington statistical area, by the study’s measures, 35.3% of the workforce are low-income earners.¹⁸

2.1 The Generational Ripple Effects of Hunger

Both in Hennepin County and the United States, children are affected by food insecurity at higher rates than the general population. Seen through a restorative lens, this is a liability that we carry forward with compounding effects on future social and physical wellbeing. Surveying peer-reviewed studies offers a picture of the estimated healthcare, special education, and lost work time expenses attributable to food insecurity. In Massachusetts, a state that is comparable to Minnesota in terms of population and food insecurity rates, a study put that figure at \$2.4 billion for the state in 2016. Of the \$2.4 billion, about \$1.9 billion were direct and indirect health-related costs, and special education accounted for \$520 million in expenditures.¹⁹ As a reference point, a similar 2010 study put the cost of hunger in Minnesota at \$1.3-\$1.6 billion annually.²⁰ When putting the low range of this estimate against the \$260 million food budget shortfall in the state, every dollar invested in filling the food budget gap would yield five dollars in future health and social benefits.²¹

Annual Cost of Misplaced Resources in Food (United States)



\$162B

Food wasted along food supply chain¹

+

\$160B

Healthcare costs due to food insecurity²

=

\$332B

Total cost of misplaced resources, not including environmental costs

¹USDA; ²Children's Health Watch

2.2 The Impact of Food Waste

If waste is a resource in the wrong place, perhaps no other resource is more misplaced than food. According to the United Nations, if food waste were a country, it would be the third-largest global greenhouse gas emitter following the United States and China.²² The food that is lost either during the supply chain or in households consumes about one-quarter of all water used by agriculture each year and requires land the size of China to be grown.²³

Every year in the United States, approximately 31% (133 billion pounds) of the overall food supply is wasted, with an estimated retail value of \$162 billion.²⁴ Expressed on a per capita basis, food loss at the retail and consumer levels in 2010 totaled 1.18 pounds of food per person per day, with a retail value of \$1.43. In today's dollars, this means a city the size of Minneapolis loses \$719,000 every day in food.²⁵ This is more than three times the daily amount needed to lift every resident in Hennepin County out of food insecurity.²⁶

2.3 The Business Case for Reducing Waste

The United Nations have set the following Sustainable Development Goal: To halve per capita food waste at retail and consumer level by 2030 and to reduce food loss in agriculture and processing. In developed countries, contrary to developing countries, food waste happens primarily during consumption, not during production. A study called *The Business Case for Reducing Food Loss and Waste*²⁷, whose authors include leaders from the World Resources Institute and the London Waste And Recycling Board, a pioneer in urban circular economic development, presents multiple calculations for food waste savings at the national, city and business level. In 2012–13, six West London boroughs implemented an initiative to reduce household food waste, resulting in a 15% reduction. For every £1 invested in the effort, the local government saved £8 in waste management and disposal costs. When the financial benefit calculations were extended to include benefits to households, £92 were saved in total per £1 invested.

Similarly, for companies, the return on investment in food loss and waste reduction can also be high. In a survey of more than 700 international companies, representing a range of sectors including food manufacturing, food retail, hospitality, and food service, for every \$1 invested in food loss and waste reduction, the median company generated a \$14 return.²⁸

Endnotes

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