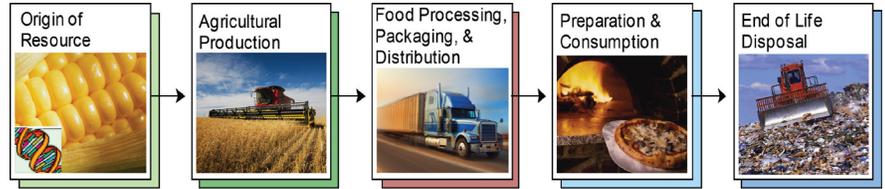


# U.S. Food System

Americans enjoy a diverse abundance of low-cost food, spending a mere 9.5% of disposable income on food.<sup>1</sup> However, store prices do not reflect the external costs—economic, social, and environmental—that impact the sustainability of the food system. Considering the full life cycle of the U.S. food system illuminates the connection between consumption behaviors and production practices.

The Food System Life Cycle



## Patterns of Use

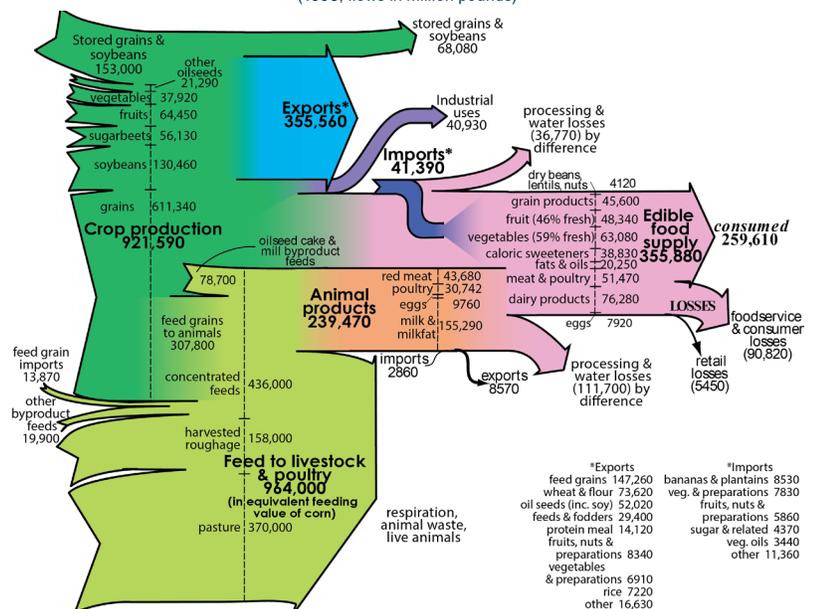
### Agricultural Production

- Farmers account for 1% of the population. Almost 28% of these farmers are between the ages of 55 to 64.<sup>2,3</sup>
- Large-scale family farms and industrial nonfamily farms account for only 4.8% of farms, but 58.3% of production (in \$). Small-scale family farms represent nearly 90% of U.S. farms, but only 21.1% of production.<sup>4</sup>
- Just 14.6¢ of every dollar spent on food in 2018 went back to the farm; in 1975, it was 40¢.<sup>5,6</sup>
- Between 2014 and 2016, 48% of the hired agricultural labor force lacked authorization to work in the United States.<sup>7</sup>
- From 1992 to 2012, total cropland decreased from 460 million acres to 392 million acres.<sup>8</sup>
- Many parts of the U.S., including agricultural regions, are experiencing increasing groundwater depletion (withdrawal exceeds recharge rate).<sup>9</sup> In 2015, 132 million acre-feet of water were used for irrigation - 52% of this water came from surface-water sources.<sup>10</sup>
- In 2017, the amount of irrigated farmland in the U.S. was over 58 million acres, more than 2 million more acres than in 2012.<sup>2</sup>
- Nutrient runoff from the upper agricultural regions of the Mississippi River watershed creates a hypoxic “dead zone” in the Gulf of Mexico. The 2017 hypoxic dead zone was the largest measured since 1985, at 8,776 sq mi.<sup>11</sup>
- From 2007 to 2012, pesticide use increased by 10% while herbicide use increased by 20% from 2010 to 2014. In 2012, the U.S. agriculture sector used 899 million pounds of pesticides.<sup>12</sup>
- In 2000, 25% of corn, 61% of cotton, and 54% of soybeans planted were genetically engineered; by 2020, these percentages increased to 92%, 96%, and 94%, respectively.<sup>13</sup>
- The UN’s Food and Agriculture Organization estimates 75 billion metric tons of soil are lost to erosion annually on fertile lands.<sup>14</sup>
- Agriculture was responsible for 9.3% of total U.S. greenhouse gas (GHGs) emissions in 2018. Methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and carbon dioxide (CO<sub>2</sub>) are the main GHGs emitted by agricultural activities. Livestock and soil management are major contributors.<sup>15</sup>

### Consumption Patterns

- In 2010, the U.S. food supply provided 4,000 calories per person per day.<sup>17</sup> Accounting for waste, the average American consumed 2,507 calories per day in 2010, an increase of 22% from 1970.<sup>18</sup>
- In 2017, 195 lbs of meat per person were available for consumption, up 25 lbs from 1967. Although red meat consumption declined almost 30% since the 1970s, chicken consumption increased steadily.<sup>19</sup>
- 33% of grains grown are used to feed animals.<sup>20</sup>
- 39.5 teaspoons of sweeteners are available per capita in the U.S. daily; the American Heart Association recommends limiting added sugars to 6 and 9 teaspoons daily for average females and males, respectively.<sup>18,21</sup>
- Approximately 40% of U.S. adults and over 18% of 12-19 year old are obese (BMI > 30).<sup>22</sup>
- Diet plays a significant role in health. Diets lacking fruits and vegetables can increase risk of heart disease, certain cancers, and stroke—leading causes of U.S. deaths.<sup>22,23</sup>
- The EPA estimated that in 2010, 31% of the food supply was lost, 50% more than in 1970.<sup>24,25</sup> In 2017, more food reached landfills than any other material.<sup>26</sup> This waste accounts for roughly 15% of the municipal solid waste stream and represents a loss of \$450 per person each year.<sup>25,27</sup> One estimate suggests that 2% of total annual energy use in the U.S. is used to produce food that is later wasted.<sup>28</sup>

Material Flow in the U.S. Food System<sup>16</sup>  
(1995, flows in million pounds)

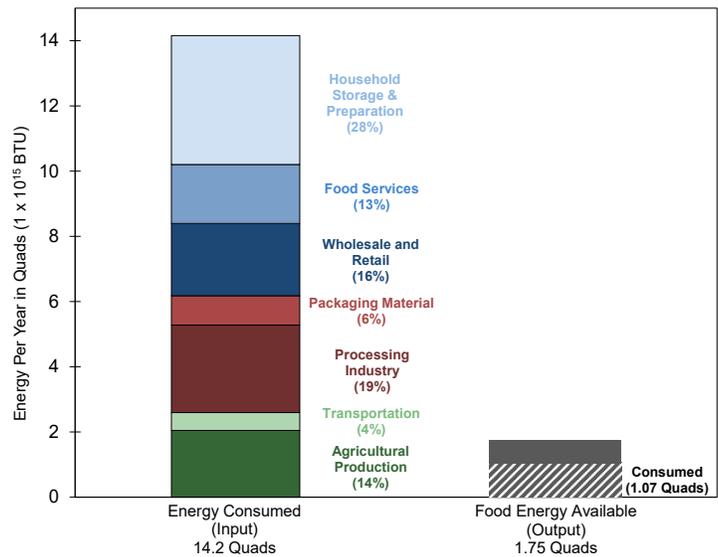


## Life Cycle Impacts

The energy used by a system is often a useful indicator of its sustainability. Food-related energy use accounts for over 12% of the national energy budget.<sup>31</sup> Agriculture and the food system as a whole have developed a dependence on fossil energy; 13 units of (primarily) fossil energy are input for every unit of food energy available.<sup>18,29</sup>

- Food production of U.S. self-selected diets amounts to 4.7 kg CO<sub>2</sub>e and 25.2 MJ fossil fuel energy demand per capita per day.<sup>32</sup>
- Reliance on fossil fuel inputs makes the food system increasingly vulnerable to oil price fluctuations.<sup>16</sup>
- Consolidation of farms, food processing operations, and distribution warehouses often increases distance between food sources and consumers.<sup>16</sup>
- Consolidation in the food system is also concentrating management decisions into fewer hands. For example:
  - Four firms control 85% of the beef packing market; 82% of soybean processing is controlled by four firms.<sup>33</sup>
  - The top four food retailers sold almost 45% of America's food in 2016, compared to only 17% in 1993.<sup>34</sup>

Energy Flow in the U.S. Food System<sup>16,17,18,29,30</sup>



## Solutions and Sustainable Alternatives

### Eat Less Meat

Meat-based diets use more energy to produce than vegetarian diets, one study suggests twice as much.<sup>16</sup> One serving of beef has more associated greenhouse gas emissions than 20 servings of vegetables.<sup>35</sup> Meat production as it is widely practiced today also has significant environmental impacts on land use, water use, and water pollution.<sup>36</sup> 20% of Americans cause half of the food-related GHG emissions; a diet shift away from meat could reduce this, with some studies estimating reductions of up to 73%.<sup>32,37</sup>

### Reduce Waste

Much of household food waste is due to spoilage. Prevent food from going bad by buying smaller amounts; planning meals and sticking to shopping lists; and freezing, canning, or preserving extra produce.<sup>38</sup> Direct-to-consumer meal kits are growing in popularity. By streamlining the supply chain, and reducing food waste and last-mile transportation, meal kits are responsible for 25% lower GHG emissions than a store bought meal.<sup>39</sup> Many foods that are still safe are thrown out due to confusion about “sell-by” and “use-by” dates; for further information, see the USDA’s Food Safety and Inspection Service.<sup>40</sup> Whether washing dishes manually or in a dishwasher, save water and energy by using best practices such as not letting water run constantly, rinsing in cold water, only run dishwashers with full loads, and avoid pre-rinsing dishes.<sup>41</sup>

### Use Less Refrigeration

Home refrigeration accounts for 13% of all energy consumed by our food system.<sup>16</sup> Today’s convenience foods rely heavily on refrigeration for preservation. Consider a smaller, more efficient refrigerator and buying smaller quantities of fresh produce more frequently. Refrigerator efficiency more than doubled from 1977 to 1997, but increases in size have largely offset this improvement.<sup>16,42</sup>

### Eat Organic

Organic farms do not use chemicals that require large amounts of energy to produce, pollute soil and water, and present human health impacts. Sales of organic food in 2019 were 5.0% higher than in 2018; organic food now accounts for 5.8% of all food sold in the U.S.<sup>43</sup>

### Eat Local

Transportation accounts for approximately 14% of the total energy used in the U.S. food system.<sup>44</sup> There is significant room for improvement in how people acquire their food. Community Supported Agriculture and Farmers Markets are great ways to support your local food system.

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