



Center for Sustainable Systems

University of Michigan
440 Church Street, Ann Arbor, MI 48109-1041
phone: 734-764-1412 fax: 734-647-5841
email: css.info@umich.edu
<http://css.snre.umich.edu>

U.S. Food System

factsheets

Patterns of Use

Americans enjoy a diverse abundance of low-cost food – spending a mere 9.5% of disposable income on food.¹ However, store prices do not reveal 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 (graphic right) illuminates the connection between consumption behaviors and production practices.

The Food System Life Cycle



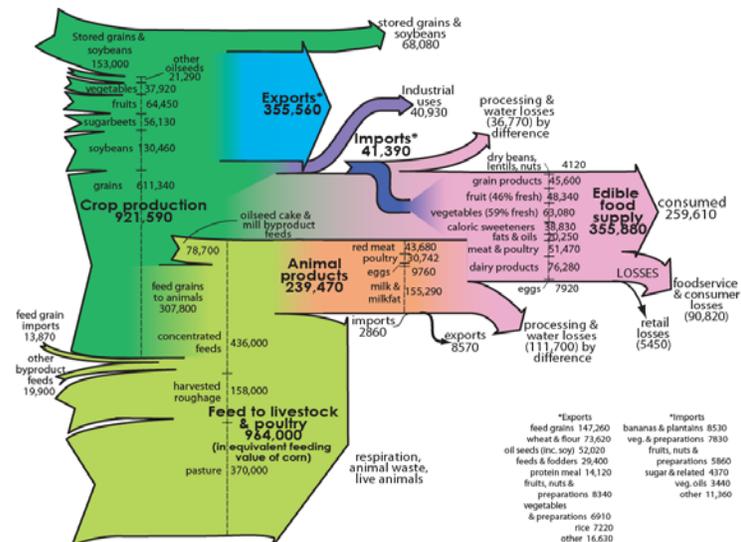
Agricultural Production

- Farmers account for about 1% of the population, and the average age of farmers is rapidly increasing.²
- Large-scale family farms account for 9% of all farms and 66% of agricultural production.³
- A mere 19¢ of every dollar spent on food in 2006 went back to the farm⁴ – in 1975 it was 40¢.⁵
- Four out of every five farm households earned the majority of their income from off-farm sources.²
- In 2001-2002, 53% of the hired crop labor force lacked authorization to work in the United States.⁶
- From 2002 to 2007, total cropland acres decreased from 434 million acres to 406 million acres.²
- Many parts of the U.S., including agricultural regions, are experiencing groundwater depletion (withdrawal exceeds recharge rate).⁷
- Nutrient runoff in the agricultural upper regions of the Mississippi River creates a hypoxic “dead zone” in the Gulf of Mexico. The average size of the region was over 6,600 sq mi from 2004 to 2008.⁸
- Less than 20% of corn, soy, and cotton plants were genetically engineered in 1996; by 2010 86% of corn and 93% of soybeans were.¹¹
- In 2007, 1.73 billion tons of topsoil was lost to erosion, equal to about 200,000 tons each hour.¹²
- Despite a tenfold increase in insecticide use between 1945 and 1989, crop losses due to insect damage nearly doubled.⁹ In 2007 the agriculture sector used 877 million pounds of pesticides in the U.S.¹⁰
- Agricultural activities were responsible for 6% of total U.S. greenhouse gas emissions in 2009. Livestock are major contributors.¹³

Consumption Patterns

- In 2006, the U.S. food supply provided 3,900 calories per person per day.¹⁴ Accounting for waste, the average American consumed 2,673 calories per day in 2008 – an increase of 23% from 1970.¹⁵
- In 2008, 200 pounds of meat per person was available for consumption, which is up 13 pounds from 1970.¹⁶ 38% of grains grown are used to feed animals (down from 50%+ in past years).¹⁷
- The average American ate 30 tsp. of added sweeteners and sugars per day in 2005 – more than triple the recommended amount.¹⁸
- More than 73% of U.S. adults are overweight or obese (body mass index 25+), and nearly 20% of children age 6-19 are obese.¹⁹
- Physical inactivity and obesity accounted for 407,000 premature deaths in 2005.²⁰ Diet contributes to heart disease, certain cancers, and stroke –three major causes of U.S. deaths.¹⁹
- In 2003, the cost of obesity-attributed medical expenditures in the U.S. was \$75 billion – taxpayers financed half.²¹
- 26% of the edible food available is wasted at the consumer level. (See “Losses” in figure).²²

Material Flow in the U.S. Food System²²
(1995, flows in million pounds)



¹ USDA Economic Research Service (2010). Food CPI, Prices and Expenditures: Food Expenditures by Families and Individuals as a Share of Disposable Personal Income.

² USDA (2009) 2007 Census of Agriculture. United States Summary and State Data. Volume 1, Geographic Area Series, Part 5.1.

³ USDA (2010) Structure and Finances of U.S. Farms, Family Farm Report, 2010 Edition.

⁴ USDA Economic Research Service (2009) Briefing Room, Food Marketing System in the U.S.: Price Spreads from Farm to Consumer.

⁵ Elitzak, H. (1999) Food Cost Review, 1950-97. U.S. Department of Agriculture, Agricultural Economic Report 780.

⁶ U.S. Department of Labor (2005) Findings from the National Agricultural Worker Survey 2001- 2002. Office of the Assistant Secretary for Policy, Office of Programmatic Policy.

⁷ USGS (2003) Ground-Water Depletion Across the Nation. USGS Fact Sheet-103-03.

⁸ NOAA (2008) Survey Cruise Records Second-Largest “Dead Zone” in Gulf of Mexico Since Measurements Began in 1985.

⁹ Pimentel, D. et. al (1991) “Environmental and economic impacts of reducing U.S. agricultural pesticide use” Handbook on Pest Management in Agriculture CRC Press, Boca Raton, FL, pp. 679-718.

¹⁰ US EPA (2011) Pesticide Industry Sales and Usage: 2006 and 2007 Market Estimates.

Life Cycle Impacts

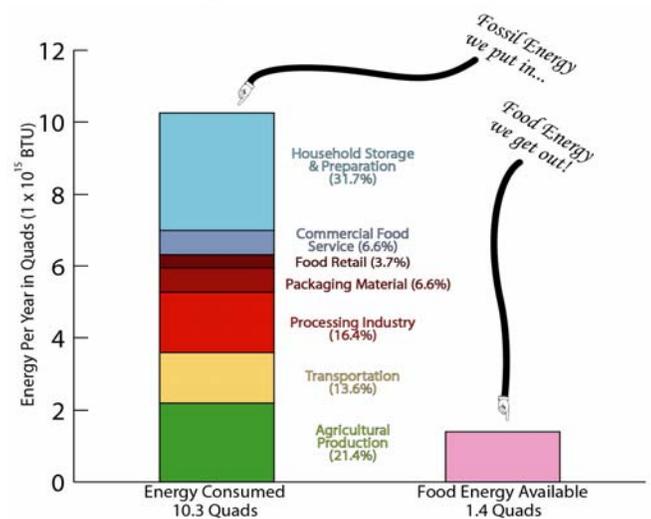
The energy consumed in a system is often a useful indicator of its sustainability. Modern agriculture and the food system as a whole have developed a strong dependence on fossil energy. The figure below estimates the energy required throughout the current food system. 7.3 units of (primarily) fossil energy are consumed for every unit of food energy produced.²²

- On-farm production amounts to approximately 20% of the total system energy. 40% of agriculture production energy goes into making chemical fertilizers and pesticides.²²
- Large amounts of energy go into processing, transporting, storing and serving food.²²
- Reliance on large fossil fuel inputs makes the food system increasingly vulnerable.²²
- Consolidation of farms, animal production facilities, meat packing plants, food processing operation, and distribution warehouses often places further distance between food sources and consumers.²²

Consolidation in the food system is also concentrating management decisions into fewer hands, raising questions of growing market control by a few corporations. For example:

- Over 80% of the beef packing market is controlled by 4 firms; 4 firms control 80% of soybean processing.²³
- The top five food retailers sell 48% of America's food (in 1997 it was only 24%).²³

Energy Flow in the U.S. Food System



Solutions and Sustainable Alternatives

Simply being conscious of the economic, social, and environmental impacts of our food system is the first step towards sustainability. Ask yourself: Where did this food come from? How was it grown? How did it get to my plate in its present form?

Eat Locally

Fresh produce eaten in the Midwest travels an average of more than 1,500 miles. A study by the Leopold Center showed that increasing Iowa's consumption of regionally grown fresh produce by only 10% would save over 300,000 gallons in transportation fuel per year.²⁴ The environmental and social consequences of food production get more attention when it is in "our own back yard." Community Supported Agriculture (CSAs) and Farmers Markets are both great ways to support a local food system.

Eat Less Meat

A meat based diet (28% calories from animal products) uses twice as much energy to produce as a vegetarian diet.²² Meat production as it is widely practiced today also has significant environmental impacts on land use, water use and water pollution, and air emissions. According to the Union of Concerned Scientists – considering land use, and water use and pollution – eating less meat is one of the most effective environmental consumer choices.²⁵

Eat Organic

Organic foods reduce the use of chemical fertilizers and pesticides that require large amounts of energy to produce, pollute the soil and water, and present real human health impacts. The growth rate for organic food products in 2008 over 2007 was 15.8%. Organic food now accounts for 3.47% of all food products sold in the U.S.²⁶

Use Less Refrigeration

Home refrigeration accounts for 13% of all energy consumed by our food system.²² 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 potential savings.

¹¹ USDA Economic Research Service (2010) Adoption of Genetically Engineered Crops in the U.S.

¹² USDA National Resources Conservation Service (2009) "2007 National Resources Inventory."

¹³ U.S. EPA (2009) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2007. Washington, DC 20460. EPA 430-R-09-004.

¹⁴ USDA Economic Research Service (2009) Data Sets: Nutrient Availability.

¹⁵ USDA Economic Research Service (2010) Loss-Adjusted Food Availability. Data Sets.

¹⁶ USDA Economic Research Service (2010) Red Meat and Chicken (Retail Weight) - Per Capita Availability.

¹⁷ USDA Economic Research Service (2010) Feed Grains - Supply and Disappearance Tables.

¹⁸ USDA Economic Research Service (2008) Food Availability (Per Capita) Data System. Dietary Assessment of Major Trends in U.S. Food Consumption, 1970-2005. EIB 13.

¹⁹ Centers for Disease Control and Prevention (2010) FastStats, <http://www.cdc.gov/nchs/fastats/overwt.htm>

²⁰ Danaei, Goodarz, et al (2009) The Preventable Causes of Death in the United States - Comparative Risk Assessment of Dietary, Lifestyle, and Metabolic Risk Factors. Public Library of Science: Medicine.

²¹ Finkelstein, Eric A., Ian C. Fiebelkorn, and Guijing Wang. (2004) "State-Level Estimates of Annual Medical Expenditures Attributable to Obesity." Obesity Research Vol. 12 No.1.

²² Heller, Keoleian (2000) Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System, The University of Michigan - Center for Sustainable Systems, Ann Arbor, MI, 1-60, CSS00-04.

²³ Hendrickson, Mary and William Heffernan (2007) Concentration of Agricultural Markets

²⁴ Leopold Center for Sustainable Agriculture (2001) "Food, fuel, and Freeways: An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emissions" Leopold Center for Sustainable Agriculture.

²⁵ Brower, M., and W. Leon (1999) *The Consumer's Guide to Effective Environmental Choices*. Three Rivers Press, New York.

²⁶ Organic Trade Association (2009) OTA's Organic Industry Survey.

