food&waterwatch

Fact Sheet

# Fossil Fuels and Greenhouse Gas Emissions from Industrial Agriculture

Fossil fuels, which include oil, coal, and natural gas, are the world's primary energy source. Unfortunately, they also are the largest source of greenhouse gas emissions.

The combustion of fossil fuels in the United States from 1990 through 2005 resulted in 22.9 billion metric tons of carbon dioxide, or 77 percent of the U.S. $Co_2$ emissions with global warming potential.[1,2] These emissions directly and indirectly contribute to climate change, which could cause droughts, floods, and heat waves, and threaten water supplies and soil moisture. Those effects could prohibit growing crops in certain regions and raise an array of human health concerns.[3,4]

## Agriculture's Excessive Energy Consumption

Ironically, industrial agriculture is contributing to its own future instability with high rates of fossil fuel consumption. Twenty percent of the fossil fuel used in the United States goes toward food production. The U.S. food system includes agricultural production, the processes involved in growing and harvesting food crops and livestock, as well as the post-agricultural processes of transporting, packaging, and storing food. This inefficient system uses 10 nonrenewable fossil fuel calories to produce only one food calorie,[5] and spends a total of 10,551 quadrillion joules of energy each year, which is roughly the same amount used annually by all of France. Only one-fifth of this energy is used in agricultural production. The rest is expended moving, processing, packaging, selling, and storing food after it leaves the farm.[6]

## Energy Spent on the Farm

The amount of energy used in agricultural production may account for only 20 percent of the total energy spent by the overall food system, but it is still staggeringly high. Industrial farms use fossil fuels to power inefficient fuel systems and spread large amounts of fertilizers and pesticides -- approximately 5.5 gallons of fossil fuels per farm acre.[7] The Environmental Protection Agency reported that U.S. agricultural production in 2005 emitted about 625 teragrams of carbon dioxide equivalent.[8] That is about as much carbon dioxide as 141 million cars release each year.[9] Farm emissions more than double when their electricity usage is included.[10]

## Energy Spent Packaging, Processing, and Refrigerating Food

The industrial agriculture and food system uses a complex series of packaging, processing, and refrigeration processes to preserve food as it travels from farm to consumer. These steps account for 23 percent of the energy consumed within the food system.[11] Energy expenditure could be greatly reduced by cutting down on processed food. For instance, fresh peas can be produced with only 40 percent of the energy required to manufacture frozen peas, and merely 25 percent of that required to package peas in an aluminum can.[12]

## Energy Spent in Transportation and Distribution

Transporting food consumes a vast amount of fossil fuels. Domestic agricultural products total 566 billion ton-miles, or 20 percent of the commodity transport within the United States.[13] A rough estimate predicts that 120 million tons of C02 emissions are directly attributable to domestic food transport each year, and U.S. imports and exports likely account for an additional 120 million tons. International imports and exports are particularly ecologically damaging because air miles emit more C02 per ton-mile than any other form of transport.[14]

A study conducted by Rutgers University states that 635,000 gallons of fuel are used annually to import tomatoes into New Jersey. It would take 1.5 square miles of forest to absorb the 6,616 metric tons of carbon dioxide this importation releases.[15]

The food system is responsible for the shipment of some non-food commodities, as well. In 1997, the transport of pesticides and fertilizers used on industrial farms accounted for 46 billion ton-miles of commodities shipped.[16] Plastic and paper for packaging, refrigerants, and other chemicals used in food processing also are shipped over long distances. Instead of being shipped straight from source to endpoint, food and related commodities travel excessive distances to distribution centers before being dispersed to retail locations.

The food system relies on chain supermarkets for massive distribution of food products. At one time, many consumers could walk to nearby markets, but now a 10- to 20-minute drive is often necessary to reach the closest grocery chain. There are not adequate sources to absorb the CO2 emissions from these trips, because the forests that once served as CO2 sinks have been chopped down for residential and commercial development, including supermarket parking lots.[17]

## Decreasing Food Miles

Many of the miles that the food system racks up are unnecessary. About $113.02 billion dollars in agricultural goods were shipped across U.S. borders in the 2007 fiscal year.[18] It is a common misconception that this level of importing and exporting is necessary in order to make a healthy and varied diet available to everyone at all times. In reality, many imported goods could be locally supplied. The real reason foods are traveling so far is that large agribusinesses are taking advantage of subsidies, price differentials, and changes in currency exchange rates to shift food between countries in search of the highest profit.[19]

## What Consumers Can Do

Consumers can decrease fossil fuel usage by eating local, seasonal foods. Buying local cuts down on food mileage, and local foods are also more likely to come from smaller, less ecologically damaging farms. To locate a farmers' market close to you, go to www.ams.usda.gov/farmers markets/map.htm. Another way to purchase local food is by joining a CSA or Community Supported Agriculture program, which takes place on farms that offer seasonal shares in their harvest. Customers pay up front and receive a weekly box of freshly picked produce. To locate a CSA near you, go to www.nal.usda.gov/afsic/pubs/csa/csa.shtml. An important part of eating locally is knowing what foods are available each season. Visit Sustainable Table's website to find out what foods are in season in your area: www.sustainabletable.org/shop/eatseasonal/.

## Endnotes

[1] Calculations conducted by Food & Water Watch based on data drawn from the cited studies. For more information, please call 202.797.6550 or e-mail foodandwater@fwwatch.org. "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005 Fast Facts." EPA, April 2007. Available at: http://epa.gov/climatechange/emissions/usinventory report.html

[2] "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005." EPA, April 2007. Report No. 430-R-07-002, p. ES 7. Available at: http://epa.gov/climatechange/emissions/usinventoryreport.html

[3] "Climate Change: Effects, Food and Agriculture." Available at: http://epa.gov/climatechange/effects/agriculture.html

[4] Bell, Michelle L. and Devra L. Davis. "Health Impacts Linked to Emissions from Fossil Fuels." Presentation. Wisconsin Energy Symposium, May 2006. Available at: www.nelson.wisc.edu/outreach/energy2006/powerpoints/bell.pdf

[5] Wilkins, Jennifer. "Food Citzen: Fossil Fuels Consume Big Portion of Food Cots." Time Union (Albany), May 7, 2006. Available at: www.timesunion.com/AspStories/story.asp?storyID=479022

[6] Murray, Danielle. "Oil and Food: A Rising Security Challenge." Earth Policy Institute, May 2005. Available at: www.earth-policy.org/Updates/2005/Update48.htm

[7] Manning, Richard. "The oil we eat: following the food chain back to Iraq." Harper's Magazine, July 23, 2004. Available at: www.harpers.org/archive/2004/02/0079915

[8] "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005," op.cit., Fig. 2-13.

[9] Calculations conducted by Food & Water Watch based on data drawn from the cited studies. For more information, please call 202.797.6550 or e-mail foodandwater@fwwatch.org.

"Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks." Office of Transportation and Air Quality, EPA, August 2005. Report No. 420-F-05-022, P. 3, 5. Available at: https://www.whatcomsmarttrips.org/pdf/Emission%20Facts%202005.pdf

625 Tg CO2Eq/(369 g x 12,000 m) = 141,147,245 cars

[10] "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005," op. cit., fig. 2-14.

[11] Murray, op. cit.

[12] Norberg-Hodge, Helena et. al. Bringing the Food Economy Home. (Bloomfield, CT: Kumerian Press, ISEC, 2002), p. 20.

[13] "Transportation-Commodity Flow Survey." Economic Census, U.S. Census Bureau, December 1999, Table 7. Available at: www.census.gov/prod/www/abs/97cf-pdf.html

[14] Norberg-Hodge, op.cit., p. 31-32.

[15] Wilkins, op. cit.

[16] "Transportation-Commodity Flow Survey," op. cit.

[17] Norberg-Hodge, op.cit., p. 32.

[18] Latest U.S. Agricultural Trade Data, Foreign Agricultural Trade of the United States (FATUS): Monthly Summary, Economic Research Service, USDA. August 2007. Available at: www.ers.usda.gov/data/FATUS/monthlysummary.htm

[19] Norberg-Hodge, op. cit., p. 19.

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