



## Number of Grain Crop Types

This EnviroAtlas national map displays the number of types of grain crops grown annually within each 12-digit hydrologic unit (HUC). It is based on the United States Department of Agriculture's 2010 Cropland Data Layer (CDL). Grains included in this map are winter wheat, durum wheat, other spring wheat varieties, barley, oats, rice, rye, sorghum, soybeans, and grain corn.

### Why is the number of grain crops important?

Number of grain crop types is one measure of the degree of agricultural specialization of a region. Some regions are heavily specialized, while others grow a greater variety of crops. Specialization varies at the level of the individual farm as well. Agricultural specialization can make it easier for farmers to increase yields and reduce their costs, though they may increase the risks to these specialized crops from weather and pests. Specialization can also increase the negative impacts of farming by increasing intensive rowcrop cultivation in a particular region or requiring more fertilizer or pesticide inputs.

Grains are an important food source, and they are some of the most commonly grown crops. Diets high in whole grains have been linked to a reduced risk of heart disease, obesity, and other illnesses. Grains are also used in animal feed, contributing to the production of meat, eggs, and dairy products. In addition, corn, one of the grains included in this map's data, is increasingly used for ethanol production.

Understanding grain production for a HUC can be useful for analyzing the economic impacts of agriculture in a region. The income from farms affects a wide group of stakeholders, including the farmers themselves, farm laborers, lenders, landlords, and the government. In particular, farms can contribute to the economic well-being of rural communities. Non-metropolitan areas tend to have higher poverty rates than metropolitan areas, and many rural counties that have the highest rates of job growth also have a high percentage of agricultural jobs.

Historically, grain has been an important export product for the United States, and it has been used as a measure of agricultural commodity trade, along with other bulk commodities like cotton and tobacco. The U.S. share of world wheat exports reached a high of 50% in the early 1970s, but it has declined since since the late 1990s to less than 20% of world markets.<sup>1</sup> While the U.S. still exports



Photo: Eric Vance, EPA

large amounts of grain, the share of grain exports has been falling as exports of meats, processed foods, fruits, and vegetables have grown, making it less reliable as an indicator of trade.

Currently, 15.6% of U.S. energy consumption takes place in the food system.<sup>2</sup> Knowing where food is produced is important because the distance between farms and consumers can affect energy use and greenhouse gas emissions associated with producing and supplying that produce. However, distance is only one part of the equation; other factors like farming techniques or the transportation mode used for shipping can have equal or greater impacts on energy consumption and emissions.

### How can I use this information?

This map, Number of Grain Crop Types, is one of several maps that provide information about the agricultural productivity of each 12-digit HUC. Additional EnviroAtlas maps show fruit, vegetable, cotton, and grain yields; the number of types of fruits and vegetables grown; the hectares of land used for fruit, vegetable, cotton, and grain crops; and the value of cotton and grain produced.

This map can provide information about the degree of agricultural specialization or diversification across the conterminous United States. The data presented here could be used to estimate the economic impacts of agriculture in a region or to analyze foodsheds (the potential sources of food for a region). It could also be used in conjunction with other maps in EnviroAtlas. For example, it could be compared

with maps showing nitrogen deposition or stream impairments to see how grain crop agriculture might affect air and water quality in a region.

### How were the data for this map created?

For each 12-digit HUC, the total number of major grain crops grown was counted using the Crop Data Layer (CDL), a map showing locations and types of crops.

### What are the limitations of these data?

The CDL is produced using satellite imagery, rather than farmer-reported data, and it is an estimation of the truth based on the best available science. Calculations based on these data are therefore also estimations. Periodic updates to EnviroAtlas will reflect improvements to nationally available data.

The CDL is updated yearly; however farms do not necessarily produce the same crops every year; this map might not reflect the current grain yields for a 12-digit HUC. This map only includes data on the most common grains; the total grain yield for a 12-digit HUC might be higher if other grains were included.

### Selected Publications

1. Bond, J., and O. Liefert. 2015. [Wheat outlook](#). U.S. Department of Agriculture, Economic Research Service, WHS-15k, 22 p. Accessed March 2021.
  2. Pirog, R., T. Van Pelt, K. Enshayan, and E. Cook. 2001. [Food, fuel, and freeways: An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emission](#). Leopold Center for Sustainable Agriculture, Ames, Iowa.
- Davis, J.C., A. Rupasingha, J. Cromartie, and A. Sanders. 2022. [Rural America at a glance: 2022 edition](#). Economic Information Bulletin No. 246, U.S. Department of Agriculture, Economic Research Service, Washington, D.C.
- Fuglie, K. O., E. Ball, and J. M. MacDonald. 2007. [Productivity growth in U.S. agriculture](#). Economic brief number 9. Economic Research Service, U.S. Department of Agriculture.
- Lin, B.-H., and S. T. Yen. 2007. [The U.S. grain consumption landscape: Who eats grain, in what form, where, and how much?](#) Economic Research Service Report ERR-50, U.S. Department of Agriculture, Washington, D.C. Accessed April 2020.
- O'Donoghue, E., R. Hoppe, D.E. Banker, R. Ebel, K. Fuglie, P. Korb, M. Livingston, C. Nickerson, and C. Sandretto. 2011. [The changing organization of U.S. farming](#). Economic Information Bulletin Number 88, Economic Research Service, U.S. Department of Agriculture, Washington, D.C. Accessed April 2020.
- Peters, C.J., N.L. Bills, J.L. Wilkins, and G.W. Fick. 2009. [Foodshed analysis and its relevance to sustainability](#). *Renewable Agriculture and Food Systems* 24:1–7.
- Regmi, A. 2001. [Changing structure of global food consumption and trade](#). Market and Trade Economics Division, Economic Research Service, U.S. Department of Agriculture, Washington, DC.
- Weber, C.L., and H.S. Matthews. 2008. [Food-miles and the relative climate impacts of food choices in the United States](#). *Environmental Science & Technology* 42:3508–3513.

### How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. The Cropland Data Layer ([CDL](#)) and CDL [metadata](#) are available on the USDA's website.

### Where can I get more information?

There are numerous resources available on grain crops and agriculture in general; a selection of these resources is listed below. For additional information on how the data were created, access the [metadata](#) for the data layer from the layer list drop down menu on the interactive map. To ask specific questions about this data layer, please contact the [EnviroAtlas Team](#).

### Acknowledgments

The data for this map were generated by Megan Culler, EPA Student Services Contractor. The fact sheet was also created by Megan Culler.