# Grain Yields

This EnviroAtlas national map displays the thousands of tons of major grains that are 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) and yield estimates from the National Agriculture Statistics Service (NASS) 2007 census and survey data. The grains included in this map are winter wheat, durum wheat, other spring wheat, barley, oats, rice, rye, sorghum, soybeans, and grain corn.

## Why are grain yields important?

Yields are an important measure of agricultural productivity because they measure the actual output of farms. Crop yields in the U.S. have increased dramatically from the mid-twentieth century to the present, mostly as a result of technological changes.

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.

Knowing the grain yields 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-metro areas tend to have higher poverty rates than metro 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 for the United States, and it has been used as a measure of the agricultural commodity trade, along with other bulk commodities like cotton and tobacco. While the U.S. still exports 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.[1] 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.


Photo: E. Vance, EPA

## How can I use this information?

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

This map can show users where grains are heavily produced in the contiguous U.S, or how many tons of grains are produced near them. The data presented in this map 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. This map 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 production affects air and water quality.

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## How were the data for this map created?

County, state, and national yield estimates for selected grains were obtained from NASS and converted to tons per hectare. These were added to the CDL raster map, which shows crop types. If a crop type did not have county-level yield data, state yields were used; if there was no county or state-level yield data available, national yield data was used. Yields for all selected grains were then summed by 12-digit HUC.

For detailed information on the processes through which these data were generated, see the metadata.

## 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. The NASS data on crop yields were not available at county level for the entire contiguous United States; state and national yields were used in these instances. However, due to wide variations in yields throughout the United States, these values might not accurately reflect yields at county levels. Calculations based on these data are therefore also estimations. Farms also 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 are included. Periodic updates to EnviroAtlas will reflect improvements to nationally available data. For more technical details about the limitations of these data, refer to the metadata. Accuracy information for the CDL and NASS can be found on their respective web sites.

## 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) is available from the U.S. Department of Agriculture. Yield estimates by crop can be obtained from NASS.

## 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 drop down menu on the interactive map table of contents and click again on metadata at the bottom of the metadata summary page for more details. To ask specific questions about this data layer, please contact the EnviroAtlas Team.


## Acknowledgments

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## Selected Publications


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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.