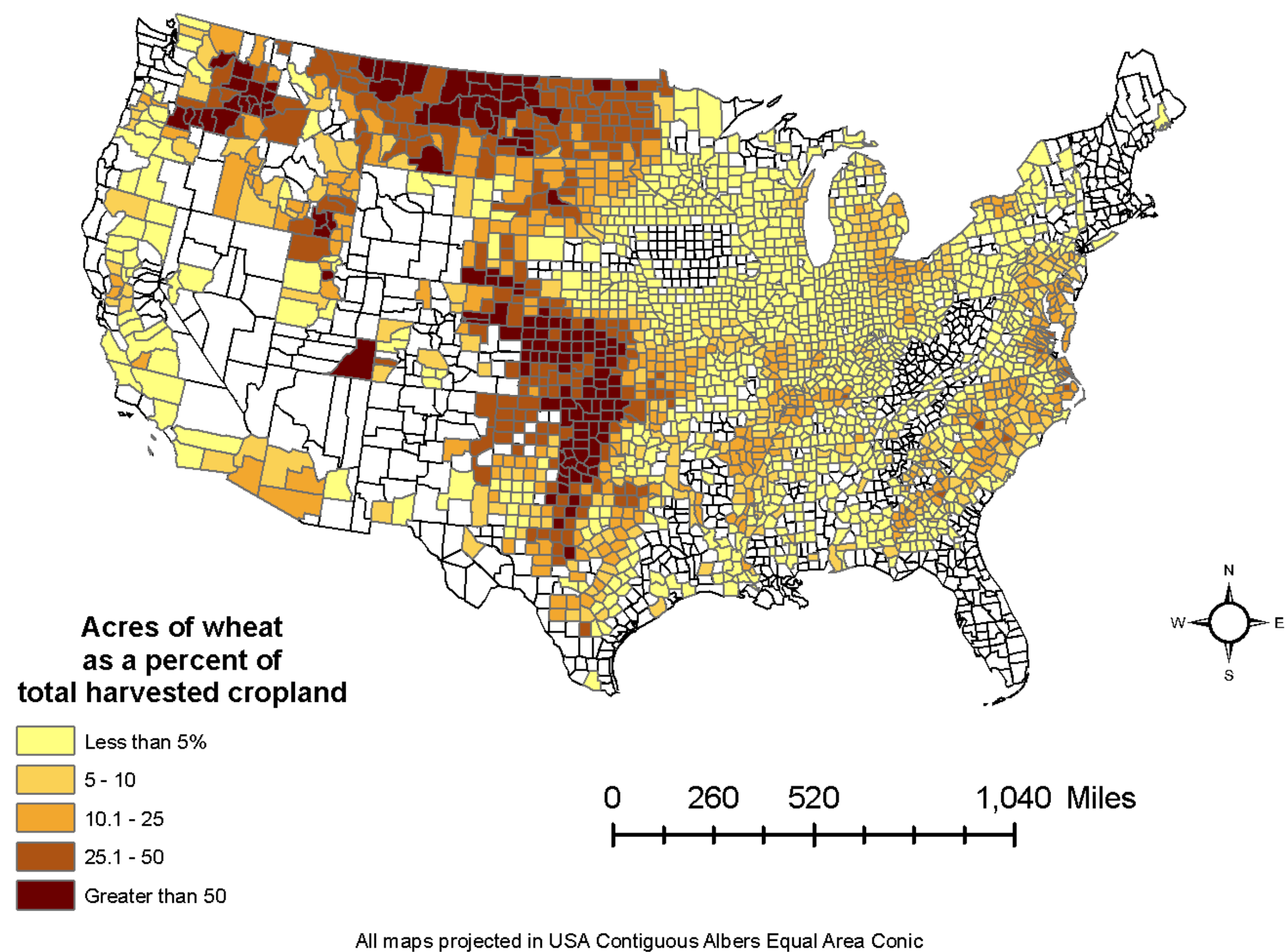
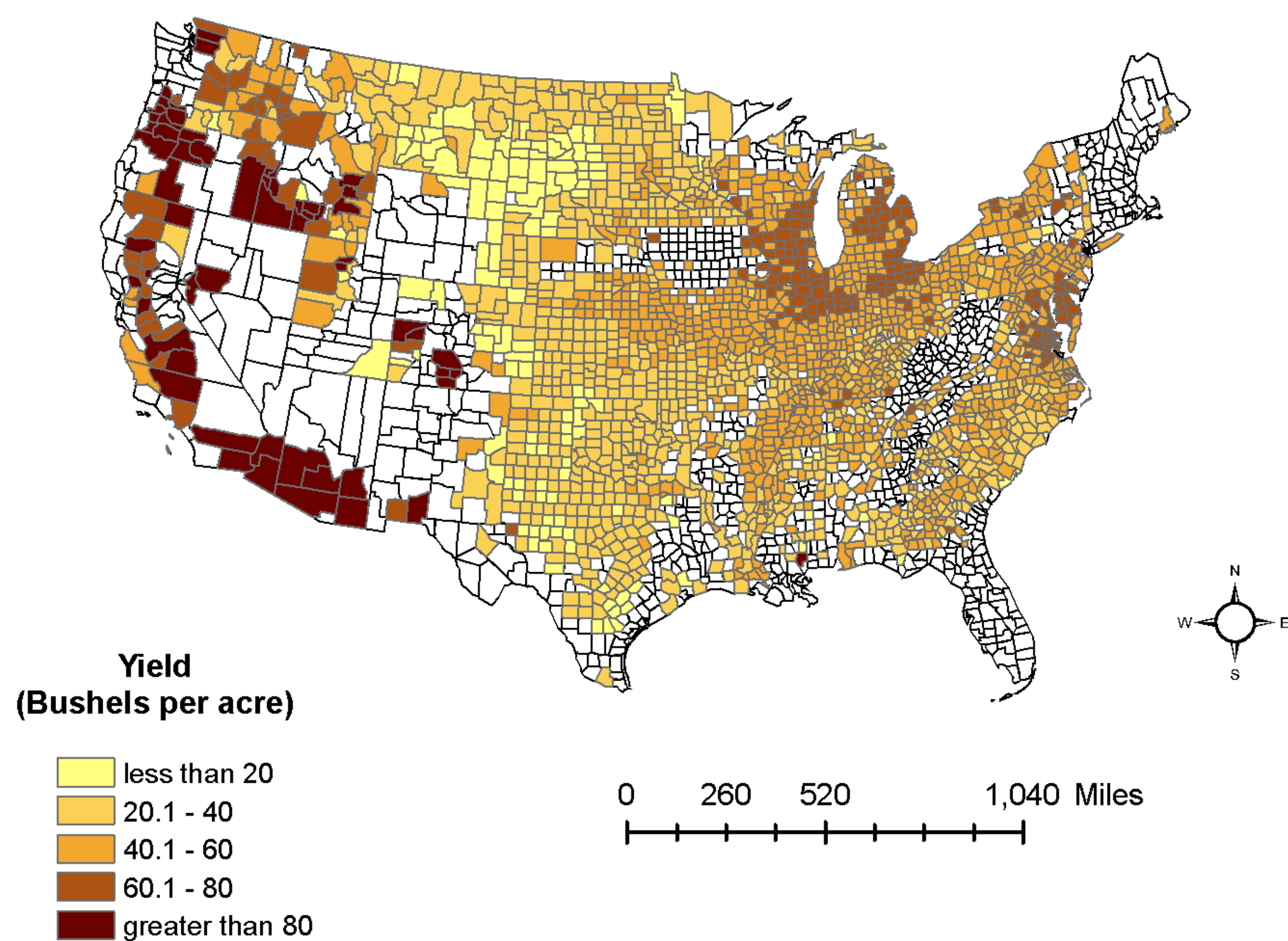


# Understanding Energy Use in the Food System: The Potential Contribution of GIS Using Wheat as an Example

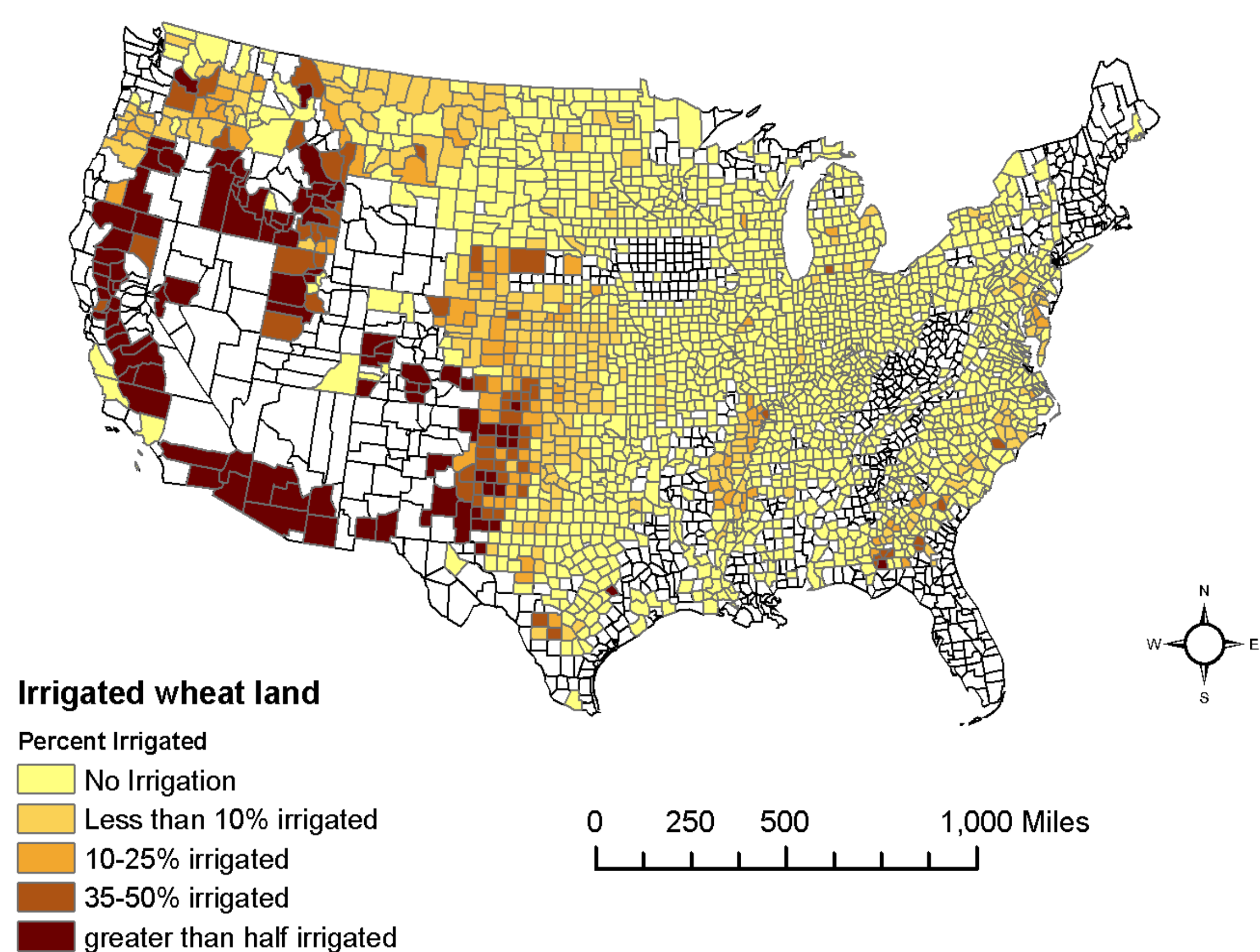
## Wheat Producing Areas



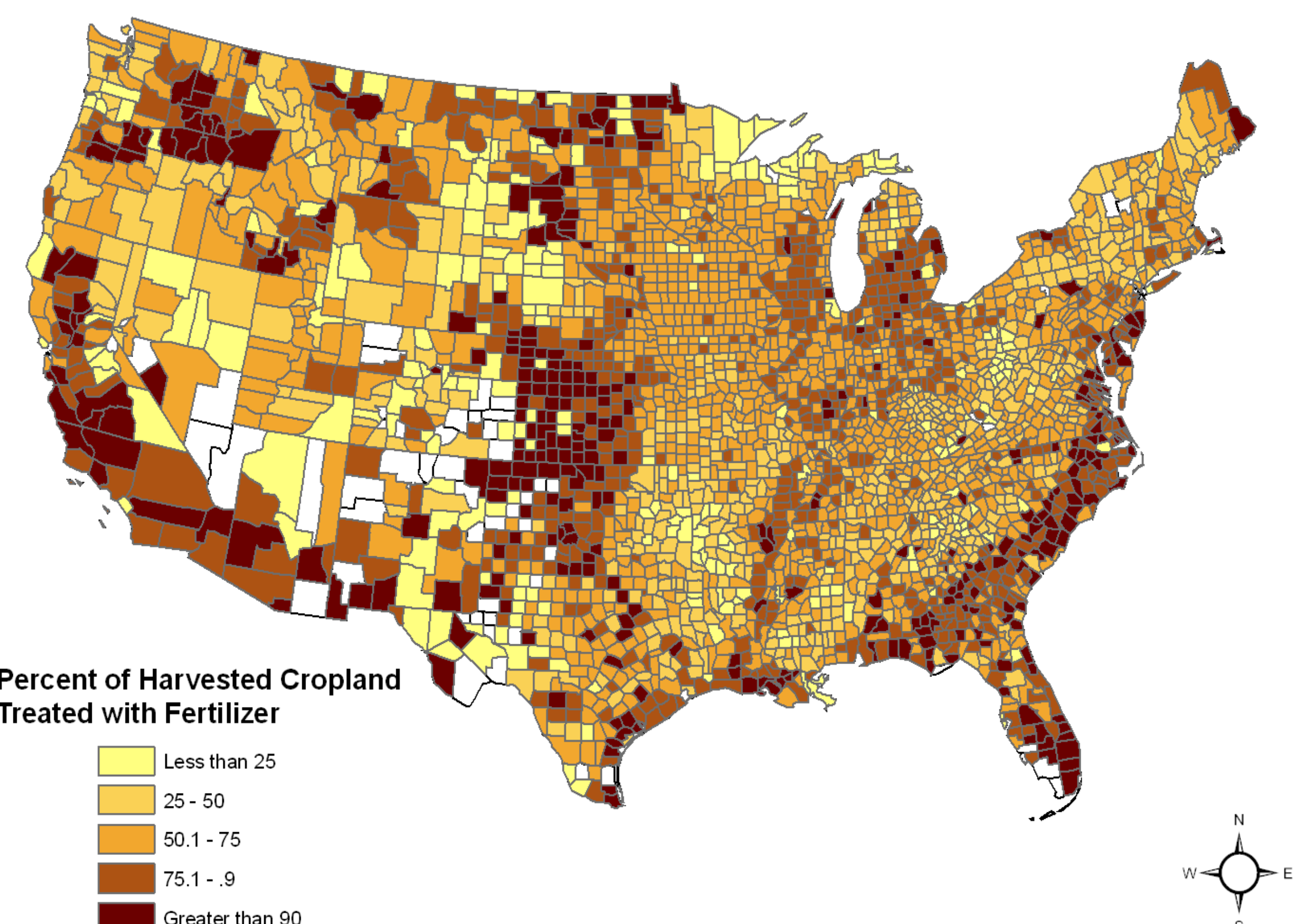
## Wheat Yields



## Irrigation of Wheat



## Fertilizer Use



The food system, including production, processing, transportation, and preparation of food, accounts for approximately 15% of total energy use in the U.S. food system. As concerns about climate change rise, reducing energy use in all sectors becomes increasingly important. Eating “locally” is promoted, in part, as a way to reduce energy use. However, transportation accounts for only 3-13% of the energy use in the food system. This is a small fraction of the total energy use in the United States. Therefore, a more sophisticated analysis of energy use in the entire food system is needed. Spatial analysis through GIS can likely play a significant role in this endeavor. This poster explores the potential for this type of analysis using wheat as an example.

The use of irrigation, synthetic fertilizers, pesticides, and farm equipment all contribute to on-farm energy use. One way to conserve energy would be to grow crops in areas where it is possible to get high yields while using few of these energy inputs. Limited data about yield and each of these energy inputs is available for the U.S. from the National Agricultural Statistics Service (NASS). This current project focuses on irrigation and fertilizer as two indications of energy use.

These maps show that several growing regions have relatively high yields of wheat without the need for any irrigation. Unfortunately, this data on irrigation is limited in a number of ways. Whether the land is irrigated is measured as a yes or no answer, so the intensity of irrigation is not measured. Similarly, some types of irrigation systems are more energy-intensive than others, but this data does not distinguish among systems.

The fertilizer map is not tied to wheat production because this data is not readily available. Instead, it is an indication of fertilizer use for all harvested crops.

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April 30, 2007

### Sources:

Food system energy estimates from Hendrickson, John. 1997. “Energy Use in the U.S. Food System: a summary of existing research and analysis.” Center for Integrated Agricultural Systems, University of Wisconsin at Madison.

Data and statistics from National Agricultural Statistics Service. 2002 *Census of Agriculture*. [http://www.nass.usda.gov/Data\\_and\\_Statistics/index.asp](http://www.nass.usda.gov/Data_and_Statistics/index.asp).