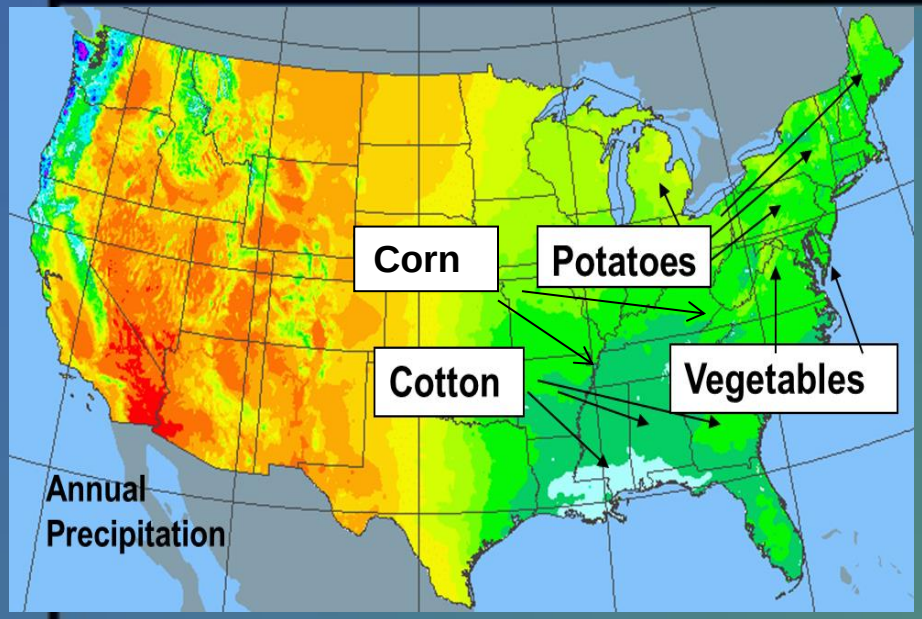
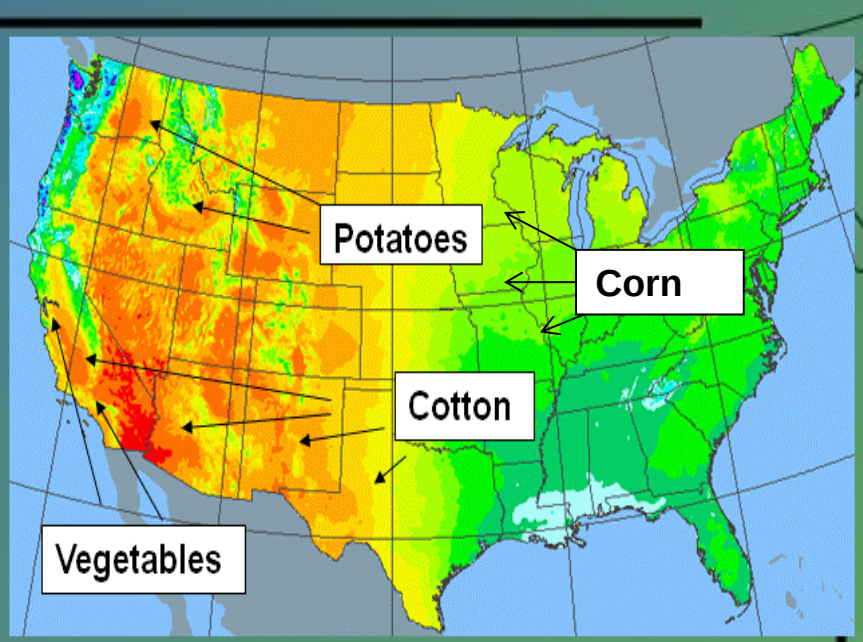




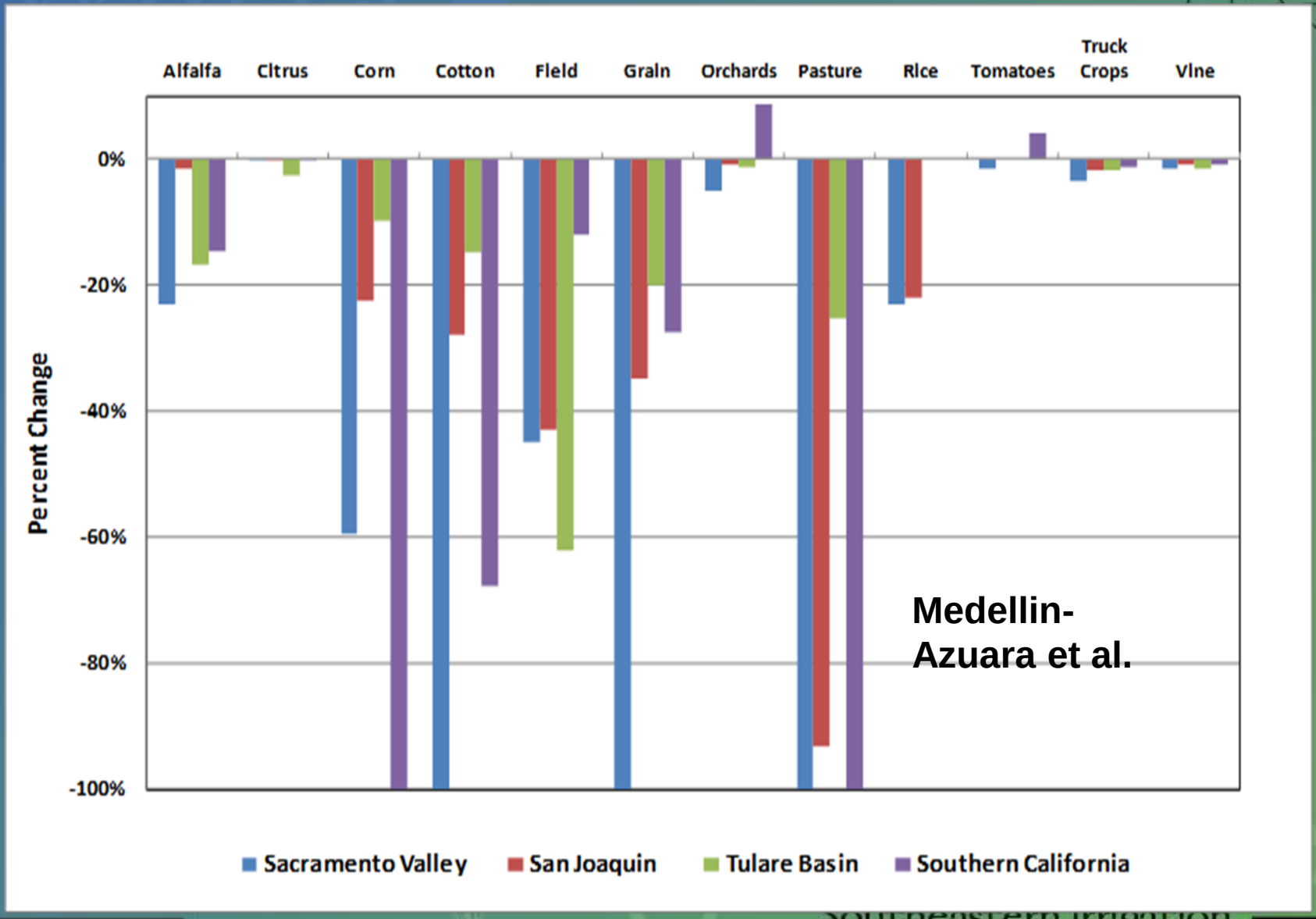
1930 **2013**

The underlying map shows precipitation.

We have moved production away from the Nation's water and concentrated grain production in a small part of the upper Midwest.

Is this a sustainable geography for U.S. agricultural production?

Shifts in Crops Due to Water Reductions



Medellin-Azuara et al.

Where can the Nation Replace This Lost Production?

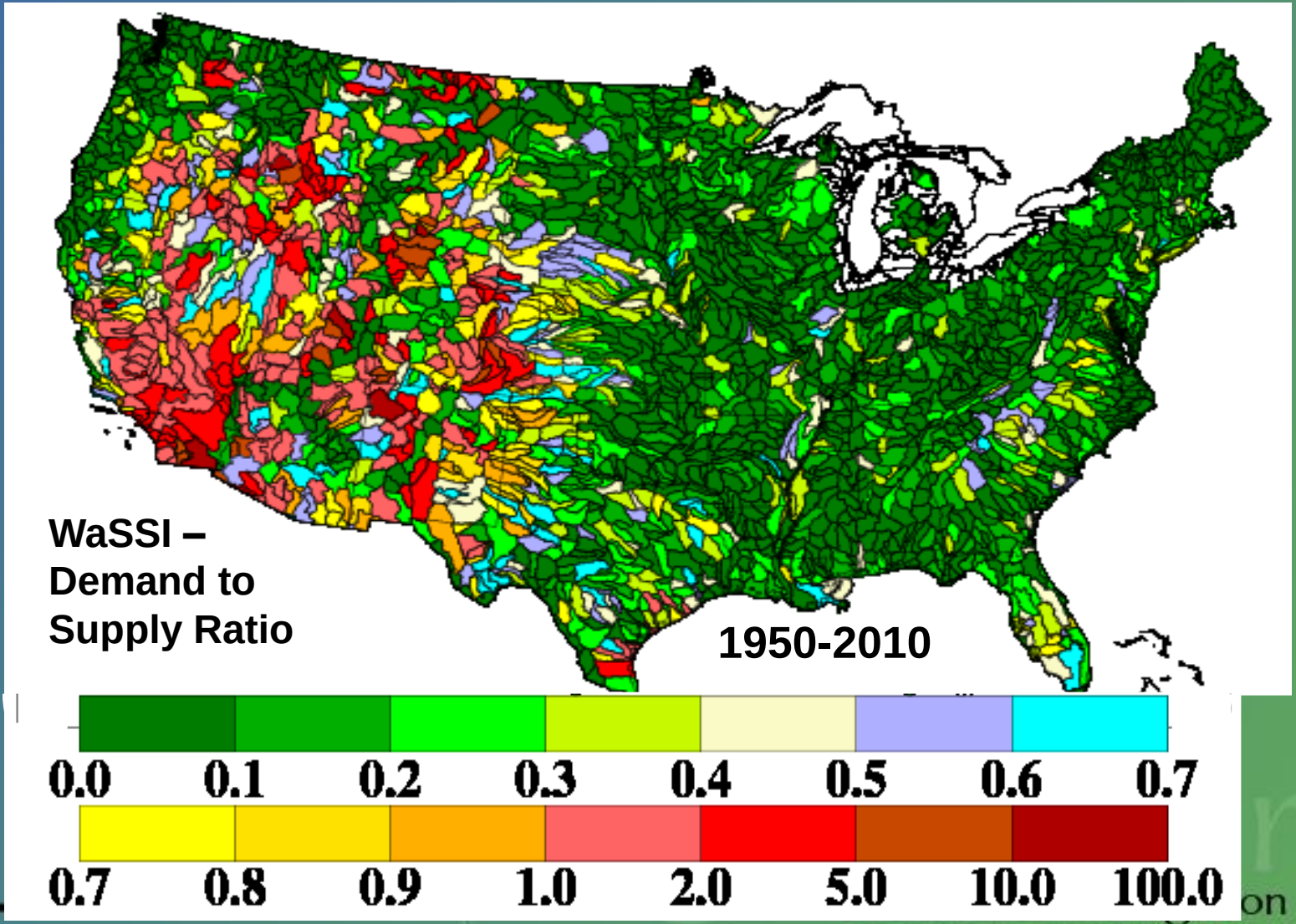
Should we let it move offshore?

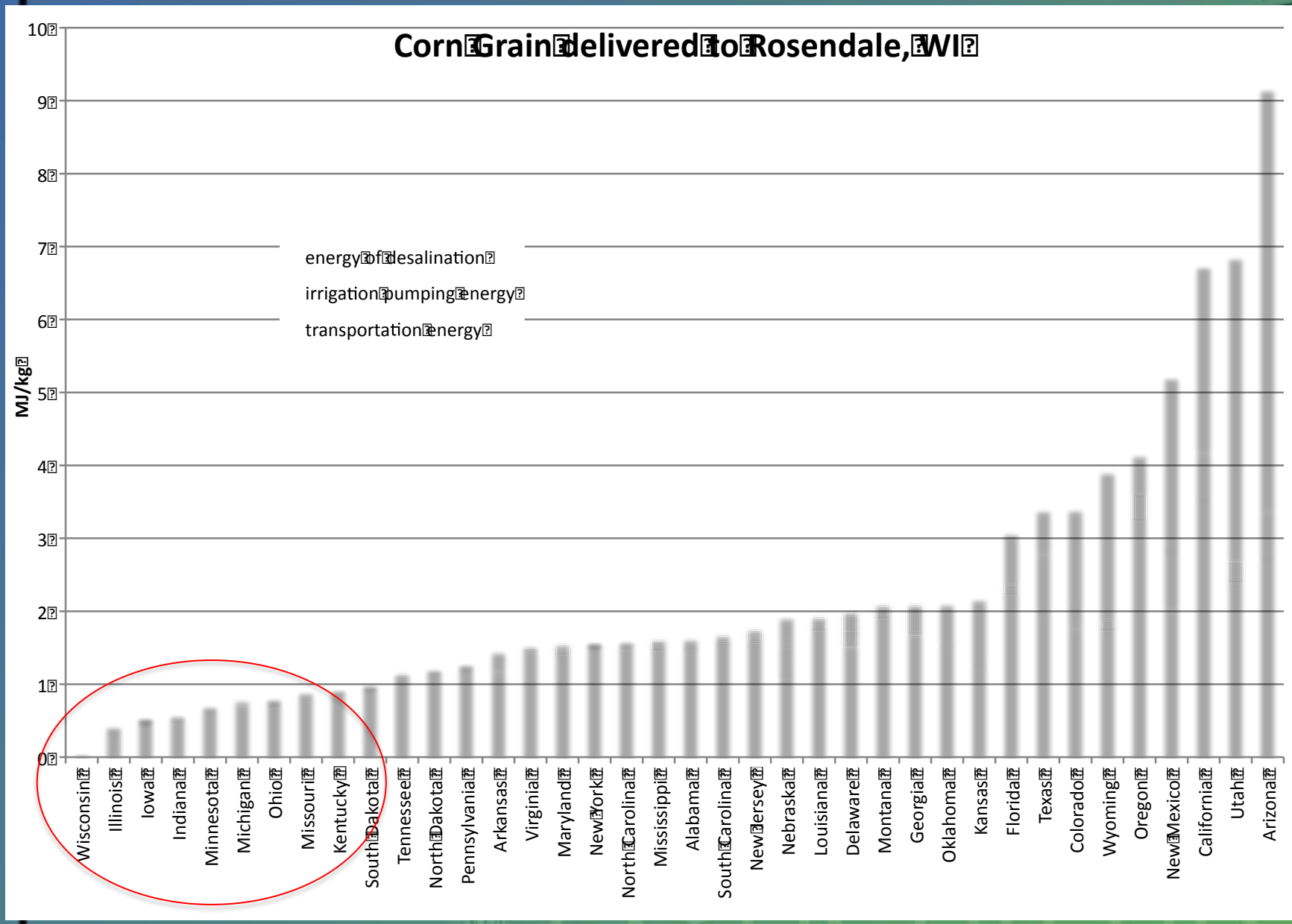
Water

Agriculture

Southeastern Irrigation

Considering all uses of water – the Eastern U.S. has far more available water





Low irrigation needs; not water stressed; favors local product

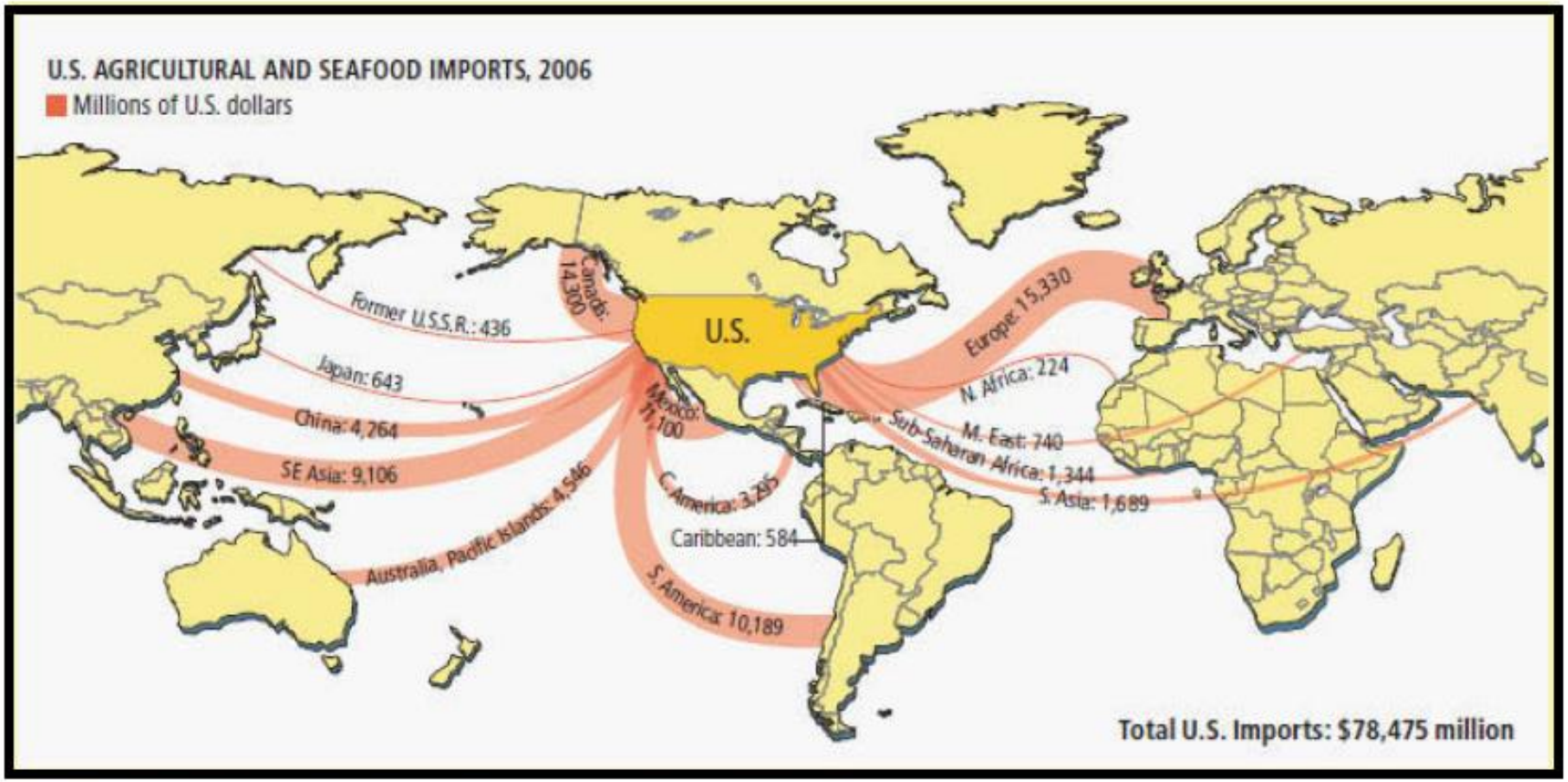
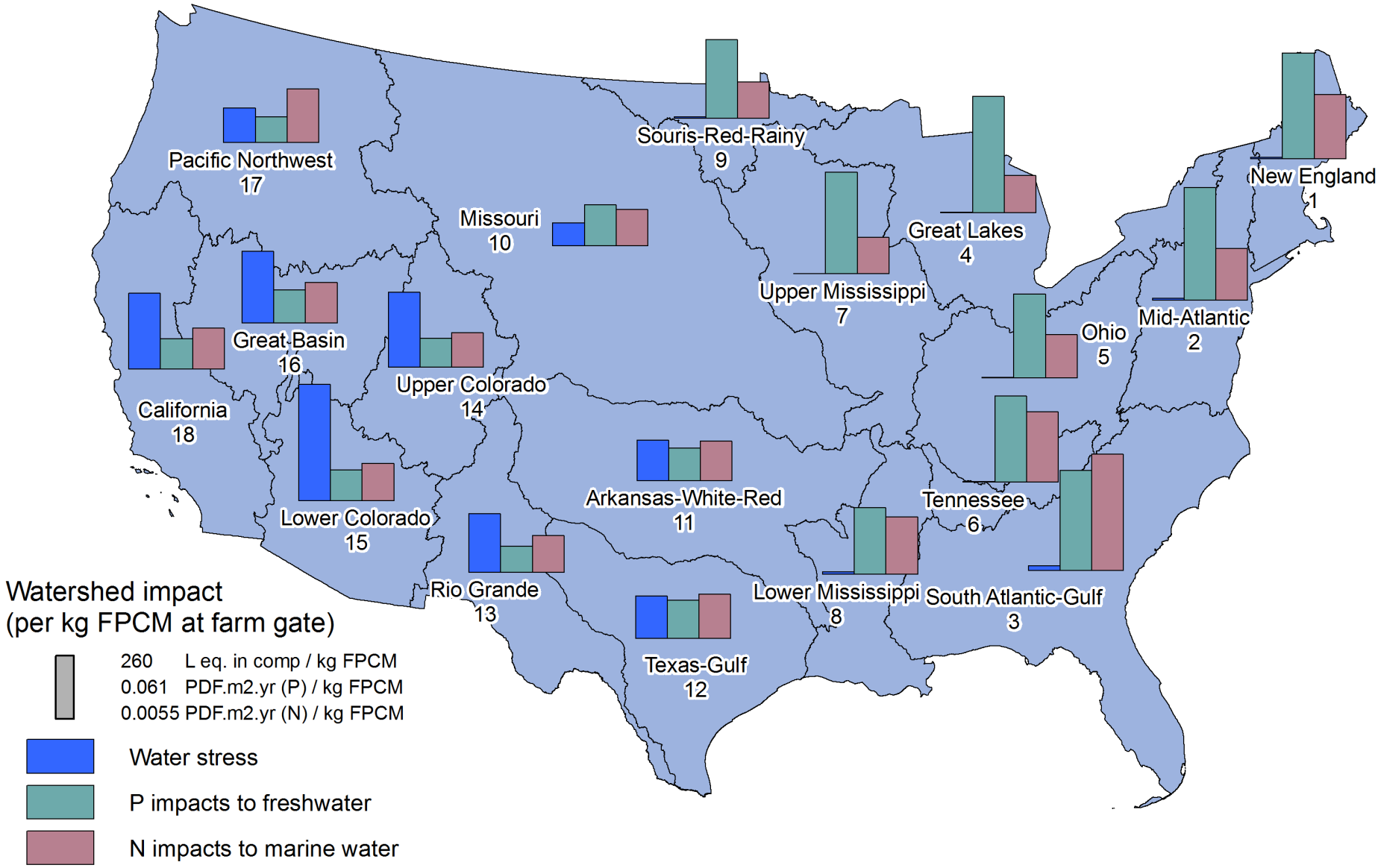
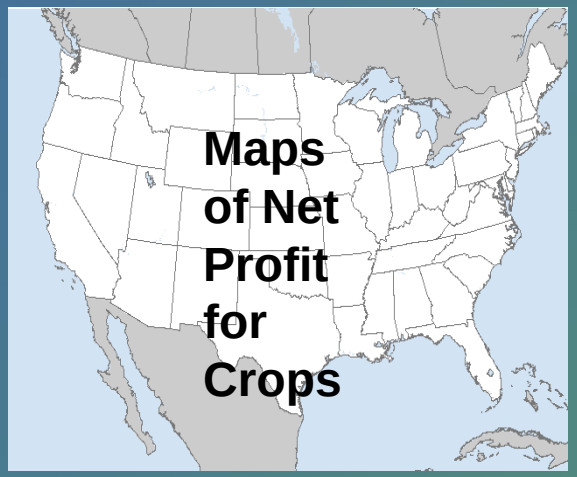


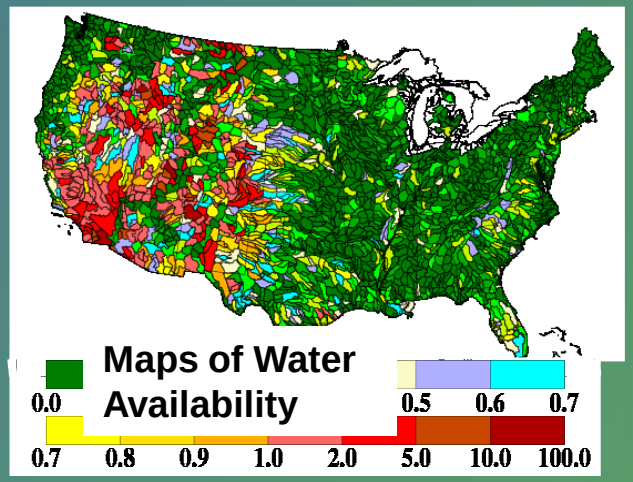
FIGURE WO-2 U.S. agricultural and seafood imports (millions of U.S. dollars).
SOURCE: George Retseck and Lucy Reading-Ikkanda for *Scientific American* magazine in Fischetti (2007).

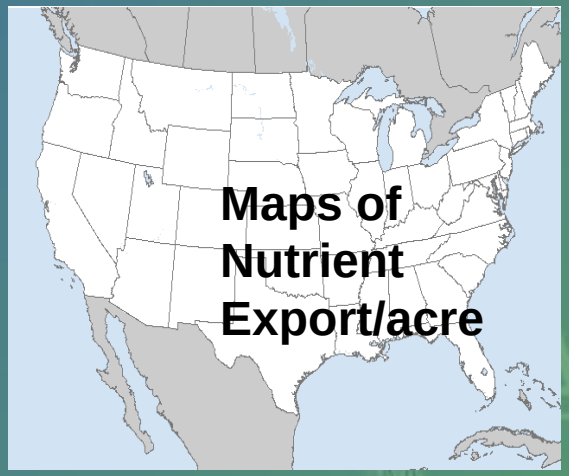
Looking at different (water)

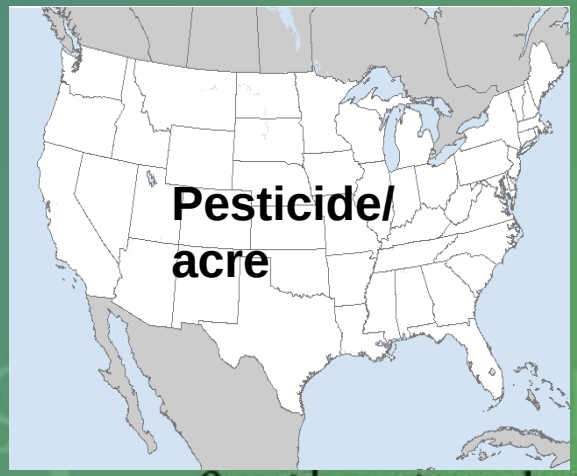


Can we define maps and metrics for economic and environmental sustainability.

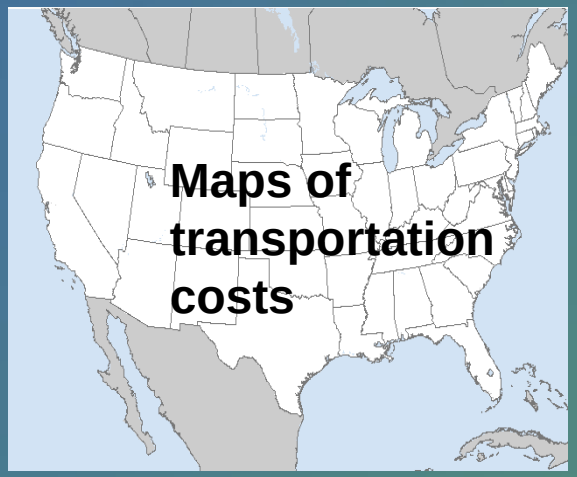


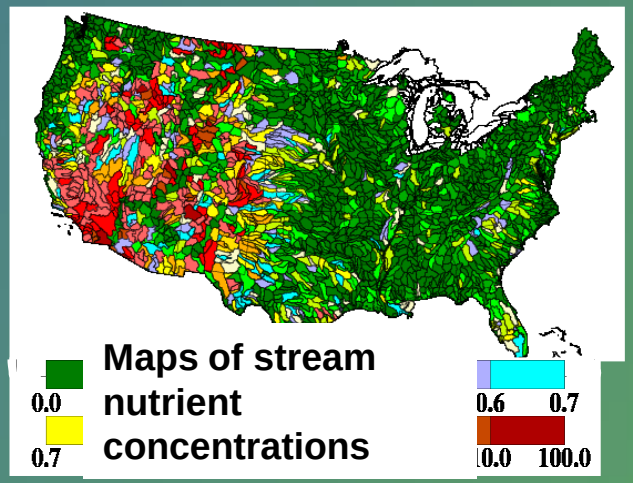


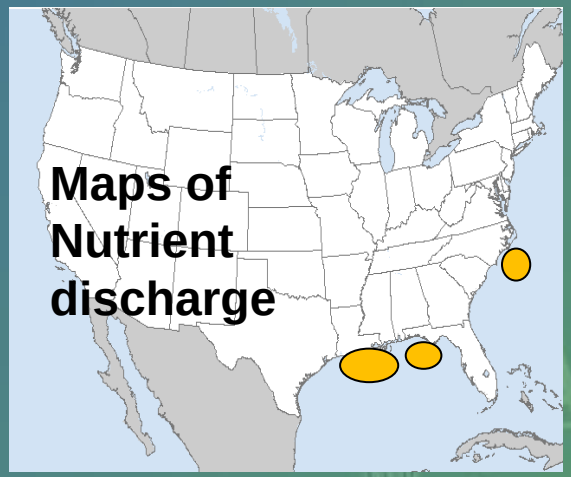


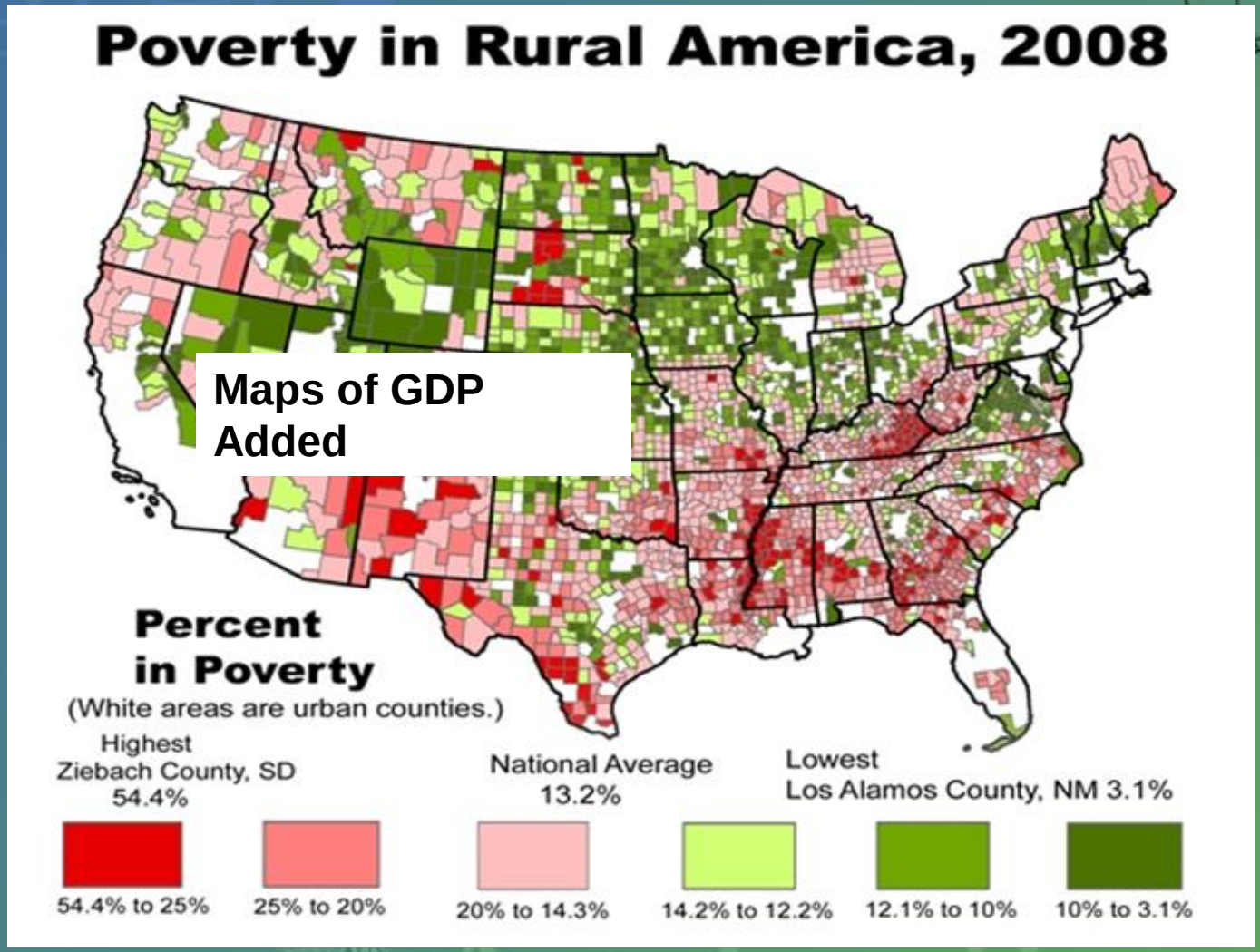


Can we define maps and metrics for economic and environmental sustainability.

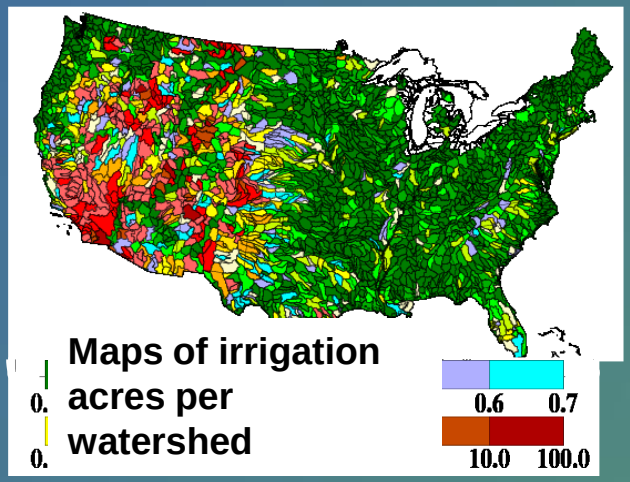


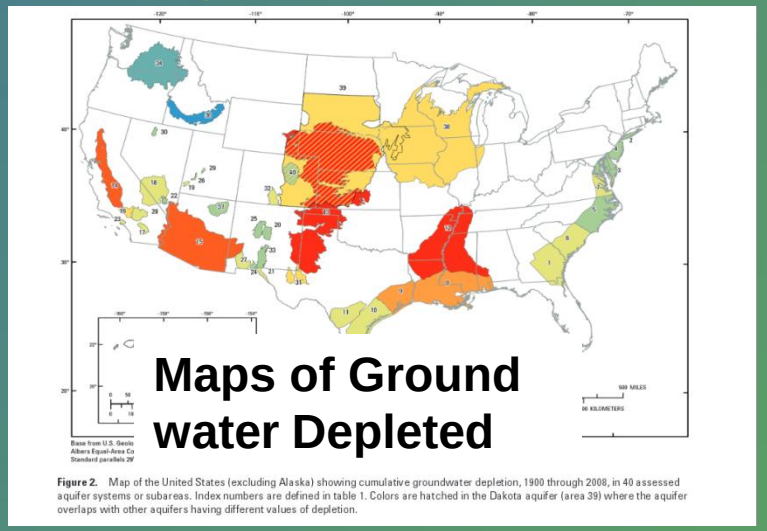


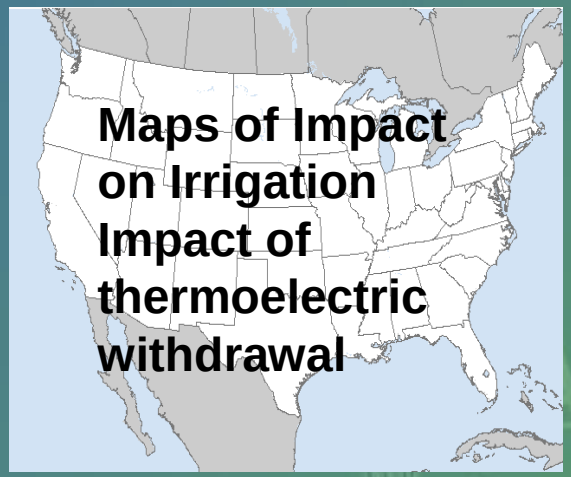



Poverty in Rural America, 2008
Maps of GDP Added
Percent in Poverty
(White areas are urban counties.)
Highest
Ziebach County, SD
54.4%
National Average
13.2%
Lowest
Los Alamos County, NM 3.1%
54.4% to 25%
25% to 20%
20% to 14.3%
14.2% to 12.2%
12.1% to 10%
10% to 3.1%

Can we define maps and metrics for economic and environmental sustainability.







Southeastern Irrigation

Water

Agriculture

Southeastern Irrigation

Components needed to define maps of economic and sustainable geography

1. Crop Models to determine yields and production costs (including water costs) in different geographical regions.
2. Hydrologic Models to determine impact and sustainability of water resources considering all competing uses of water.
3. Nutrient loading models to examine impact of production
4. Transportation Models to explicitly consider movement of agricultural goods
5. Nutrition/freshness models to examine time cost of transport to consumer.
6. Social costs of geographical production

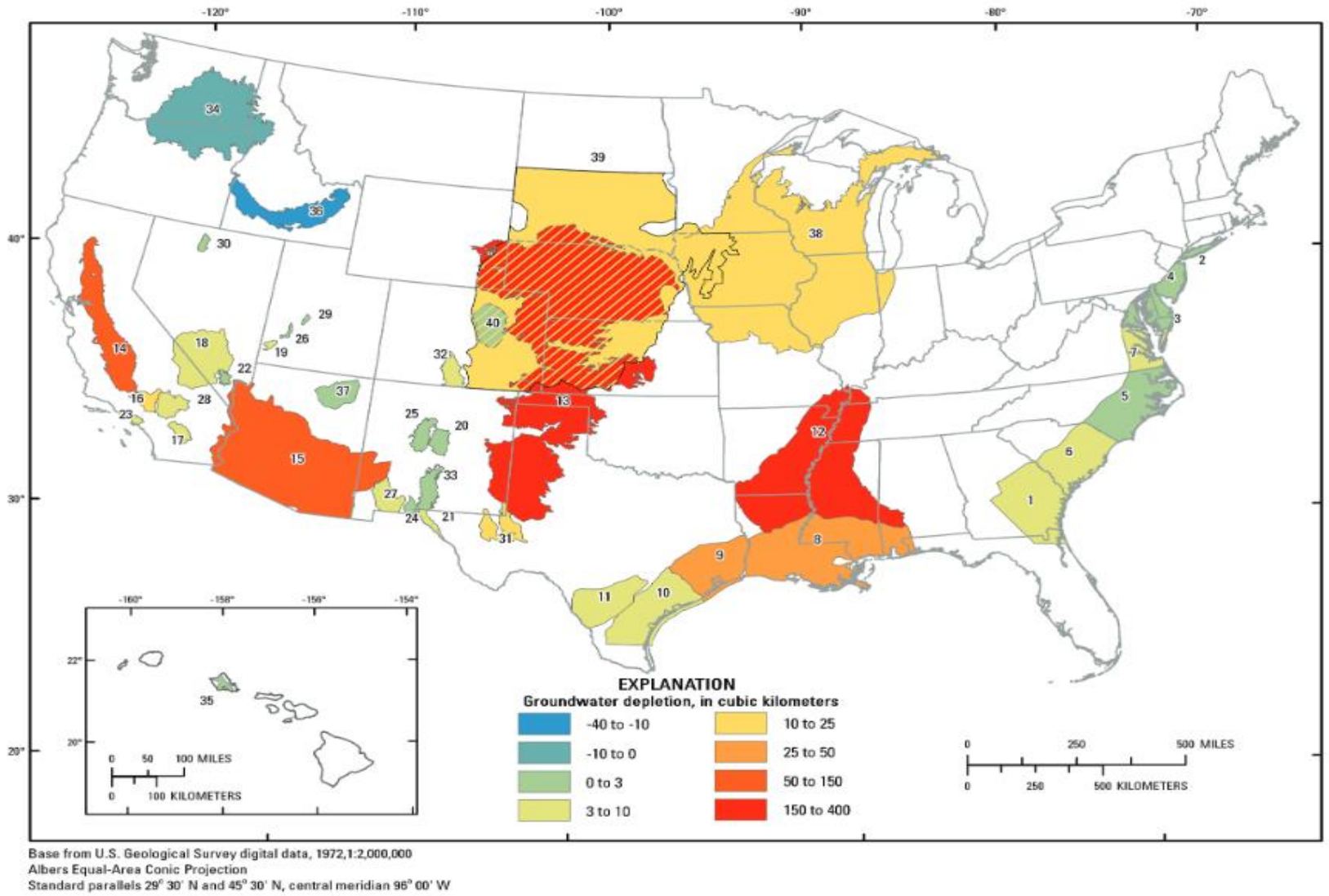


Figure 2. Map of the United States (excluding Alaska) showing cumulative groundwater depletion, 1900 through 2008, in 40 assessed aquifer systems or subareas. Index numbers are defined in table 1. Colors are hatched in the Dakota aquifer (area 39) where the aquifer overlaps with other aquifers having different values of depletion.

Is water available for irrigation during times when crops need water?