Food production in the northeastern US may need to change if climate does

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If significant climate change occurs in the United States it may be necessary to change where certain foods are produced in order to meet consumer demand. In a paper published online this week in the journal *Renewable Agriculture and Food Systems*, researchers at the Friedman School of Nutrition Science and Policy at Tufts University provide an overview of current farmland use and food production in the Northeastern U.S., identifying potential vulnerabilities of the 12-state region*.

Led by Tim Griffin, Ph.D., associate professor and director of the Agriculture, Food and Environment program at the Friedman School, the authors evaluated the degree to which the Northeast can satisfy the food needs of its residents, a concept known as regional self-reliance. Their results are based on calculations of regional agricultural land use and production between 2001 and 2010. In that time, over 100 crops were harvested and livestock production involved all six major species. The authors' estimates also include fish and shellfish.

"Food production in the United States is concentrated in certain areas, but it is important to explore the ability of all regions to produce food. This is certainly the case in the Northeast, which has both a high population density and a declining agricultural land base," Griffin said. "For example, most of the country's pork products come from Iowa and North Carolina, and most of the lettuce is grown in California's Salinas Valley. Looking ahead, there is the potential for climate change to disrupt food production in those key areas. If irrigation in the Central

Valley of California was reduced due to climate change, could other regions make up for that drop in production? And what is the capacity of the Northeast region to produce more?"

Griffin and colleagues noted substantial diversity in the Northeast food system, for crops in particular. "A different picture emerges when you look at the farmland acreage," Griffin said. "A small number of crops occupy a large portion of the cropland acreage and almost 40% of that is corn, most of it used for animal feed. A small proportion of that acreage produces foods that people eat, such apples and potatoes, although much of it contributes indirectly by supporting livestock production systems."

Griffin and colleagues found regional self-reliance to be highest for animal-based products, particularly milk and eggs. The region produces about as much fluid milk as it consumes and about 70% of the amount of eggs consumed. For seafood, the region produces 45% of the amount of shellfish it consumes and 23% of fish. Just under 30% of the amount of chicken consumed in the region is also produced there.

For vegetables, the region produces 26% of the amount of it consumes and for fruit, 18%. The vegetable crops grown in the largest amount are starchy products such as potatoes and corn. Within the fruit category, the region is most self-reliant for berries, primarily blueberries and cranberries.

Regional self-reliance in the Northeast will likely be impacted by two other factors: population growth and dietary choice. The U.S. Department of Commerce predicts that there will be an additional two million people living in the Northeast by 2030 (an increase of about 3%). "Regional self-reliance would be impacted if there were to be a shift toward eating more in line with the federal dietary guidelines, which emphasize fruits, vegetables and low-fat dairy products," Griffin noted.

The authors note that agricultural growth in the region will be challenging because of land use patterns. More than half of the region's total farmland is located in Pennsylvania and New York, with Maryland accounting for an approximate additional 20%. Another barrier is the limited supply chain infrastructure, which hampers packaging and distribution.

"Our future research will look at the complex interactions between soil suitability, climate, land use, and infrastructure and explore the policy barriers to agricultural expansion and the incentives that can be provided to address them," Griffin said. "First, we need to establish a baseline to look at all of the potential changes. If we are to change the types of foods grown on farms, where would that occur and where would there be the most potential for increased production?"

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