



## USDA Regional Climate Hubs: Managing your risk in a changing climate.



# Climate Risks in the Northeast

## What type of agricultural production is in the Northeast?

The Northeast is a diverse region containing the seven most densely populated states in the Nation. Agriculture in the Northeast is varied, including vegetable production, ornamentals and fruits, and field crops. Forests are a dominant land use in the Northern parts of the region and in the Appalachian Mountains. In 2012, the production value of principal crops in this region was approximately \$84 billion a year, and this value is increased multiple times when taking into account the wholesale and retail markets for agricultural products. Regional dairy production values in 2010 generated over \$2.5 billion, while combined animal production values (livestock, hogs, and poultry) return over \$1 billion to the region. The combined recreational and manufacturing value of forestry in just the four northern-most states in this region exceeds \$19 billion a year.

## How are climate change and weather variability affecting Northeastern producers?

The climate of the Northeast has been changing at an unprecedented rate over the past century, and scientists predict more change to come. These changes are expected to lead to shifts in weather and a greater frequency in extreme weather events. These changes pose both risks and benefits. The challenge is to effectively and efficiently manage our natural resources in the face of a changing climate. Some climate and weather changes that the Northeast is already experiencing include:

- **More intense precipitation:** Extreme rainfall events such as tropical storm Irene or hurricane Sandy are predicted to become more common in the Northeast with climate change. Intense rainfall can damage crops and infrastructure, delay spring planting or harvests, and lower yields.
- **Warmer Temperatures:** Higher average temperature means changes to growth cycles for many crops, with earlier leaf out and flowering, longer growing seasons, and later senescence resulting in possible increases in production. For example, extended growing seasons may allow for the growing of longer-season varieties of field corn or other heat tolerant crops resulting in higher yields, but crops more suitable for cooler conditions, such as potatoes, lettuce, broccoli, and cabbage, will have a shorter growing season. Satellites and ground measurements show that deciduous trees and other woody perennials in the Northeast leaf out earlier and hold their leaves several weeks later into the fall than they did 30 years ago, extending the tree growth season as well.
- **Intensifying weed, pest, and disease outbreaks:** Higher temperatures permit weeds, insects, and crop diseases to thrive and to expand their ranges northward. Weeds often benefit from higher temperatures and carbon dioxide (CO<sub>2</sub>) levels, leading to increased crop losses and greater costs for herbicide treatments. In addition, some herbicides lose their effectiveness at elevated CO<sub>2</sub> levels, requiring higher application rates and treatments. Insects that overwinter in the Northeast, such as corn earworm, flea beetle, and the spotted-wing Drosophila, are already present at higher levels earlier in the season and

this trend is expected to continue as temperatures warm. Rising winter temperatures may also allow tree pests such as the hemlock wooly adelgid to spread further north. Warmer winters increase survival rates for crop diseases, whose populations expand with earlier and wetter springs.

## What is USDA doing about it?

USDA has established a Northeastern Regional Climate Hub (NERCH) in Durham, N. H. This multi-agency effort (Agricultural Research Service, Forest Service, and Natural Resources Conservation Service) is being led by David Hollinger, Plant Physiologist at the Forest Service Northern Research Station. The Hub will deliver science-based knowledge and practical information to farmers, ranchers, and forest landowners that will help them to adapt to climate change by coordinating with local and regional partners in Federal and state agencies, universities, NGO's, private companies, and Tribes.

### *The Hub will provide:*

- Technical support for land managers to respond to drought, heat stress, floods, pests, and changes in growing season.
- Regional assessments and forecasts for hazard and adaptation planning.
- Outreach and education for land managers on ways to mitigate risks and thrive despite change.

## Building on success stories

**Plant Hardiness Mapping:** The new [Plant Hardiness Zone Map](#) was updated in 2012 by the Agricultural Research Service in Washington, D.C. and Ames, Iowa, reflecting northward warming trends, and provides important guidelines for all growers. The plant hardiness zone designations are one of the components USDA Risk Management uses in setting crop insurance standards.

**Frost Protection for Grapes:** Climate change brings increased volatility in weather patterns, and extreme weather events require quick responses to prevent losses. Cornell University provides grape growers with information on cultivar bud hardiness throughout the dormant season to indicate the need for frost protection. The Northeast Climate Hub will partner with universities like Cornell to provide information to help producers cope with changes in weather patterns.

**Emissions Information for Dairy Producers:** Animal agriculture is a recognized source of greenhouse gas emissions, but good information is lacking on the net emissions from our farms. The Dairy Gas Emissions Model (DairyGEM) developed by the USDA-Agricultural Research Service in University Park, Pennsylvania predicts the gaseous emissions from dairy production systems. Dairy producers and others can download the model for free and use it to evaluate the effect of management changes on dairy farm emissions, helping producers improve their environmental stewardship while remaining economically profitable.

## Need more information?

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