AGRICULTURE

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Key Messages

Importance of Agriculture: Agriculture is one of the most important sectors of Georgia's economy, employing almost 360,000 people and generating $70 billion dollars in value in 2019

Reduced Productivity: Climate change will likely result in an overall decrease in agricultural productivity in Georgia due to increased temperatures, more frequent drought conditions, and higher likelihood of damage to farms from severe weather events

Livestock Health*:* Higher temperatures and prolonged heat waves will negatively affect the health of outdoor livestock like cattle; while indoor livestock, like most poultry, will require greater electricity and water resources to keep cool during hotter summers

Adaptation: Georgia farmers are already utilizing strategies like smart irrigation, crop rotations, adding new crops, and partnerships with agricultural professionals to adapt to changing climate conditions and prepare for the long-term effects of climate change

Overview

Agriculture is an exceptionally important industry in Georgia, contributing $70 billion to the state's economy and almost 360,000 jobs in 2019 [1]. Many rural counties are strongly dependent on agriculture for employment, particularly in the Southwest part of Georgia. While farmers are used to improvising in the face of uncertain conditions, climate change will inevitably impact agriculture across the entire state of Georgia. Increased temperatures, variable rainfall, and altered weather patterns are a few of the climate change challenges Georgia farmers are facing. While a changing climate will test Georgia's agriculture industry, farmers are deploying new techniques, including smart irrigation and new crops, to adapt to a changing climate.

Climate change is primarily driven by the emission of greenhouse gases into the Earth's atmosphere, with carbon dioxide (CO_2) being the dominant greenhouse gas emitted by humans. While some important Georgia crops, like cotton, peanuts, and corn [1], may grow better with higher levels of CO_2 [2, 3], the enriching effects of CO_2 have to be considered in conjunction with other aspects of climate change. Many crops, particularly fruits and vegetables, are very sensitive to temperature and yields are generally expected to decline due to warming temperatures across Georgia [3]. For example, peach trees and blueberry bushes are dependent on cool winters to produce fruit. The warmer winters expected due to climate change may interfere with this natural process and reduce fruit production [4]. Furthermore, research suggests that weeds may also benefit from higher temperatures and CO_2 levels, intensifying competition with desired crops [5, 6]. Warmer temperatures can also raise humidity, increasing the occurrence fungal diseases on crops. Ultimately, the overall effect of CO_2 and temperature on agriculture will vary depending on the crop being considered and the impact of other factors like nutrients in the soil and water.

Higher temperatures will not only directly affect crops but will also impact those who work on farms. Agricultural workers are particularly vulnerable to the more intense and frequent heat waves expected due to climate change because they have fewer opportunities to cool off and escape the heat [7].

Aside from higher temperatures, climate change is also predicted to impact water availability throughout Georgia. Higher temperatures and elevated evaporation rates are predicted to increase the frequency and severity of drought across the state, which will reduce water availability from rainfall, surface water, and groundwater sources for agricultural producers [3, 8]. For farmers who rely on irrigation, reductions to water availability will increasingly conflict with water needs elsewhere in the state and may further reduce water levels in streams and rivers, threatening freshwater ecosystems [9]. More information on how climate change will impact water availability in Georgia can found on GCP's "Water Resources" page.

While drought is a primary concern, climate change is also predicted to exacerbate flooding and extreme weather events [8]. In 2018, Hurricane Michael caused nearly $2.5 billion in damages to the agriculture industry in Georgia, showing that powerful hurricanes not only threaten coastal communities but can also cause extreme damage to interior parts of Georgia [10].

The agriculture industry in Georgia is not confined to just plant crops; livestock is also a major contributor to Georgia's economy. Poultry products alone account for nearly 33% of the economic value of Georgia's agriculture sector, with beef and dairy also coming in the top ten most valuable agricultural products in the state [1]. For livestock managed outdoors like cattle, increased daily and nighttime temperatures, coupled with longer lasting and hotter heat waves [3, 11], are predicted to lead to increased heat stress among animals [3, 12, 13]. Heat stress can be extremely detrimental to the welfare and health of the animals themselves, as well as result in monetary loss for farmers through increased need for veterinary care and reduced growth of animals [12, 14]. For animals raised indoors, like chickens, heat stress is a less immediate issue. Other factors, however, may affect poultry farmers. For example, while climate change will likely reduce heating bills in the winter, the need to cool chickens in the summer will increase energy and water use in poultry houses in Georgia [15]. Overall, livestock farmers, particularly those raising their animals outdoors, will be faced with the challenge of keeping their herds healthy and productive through increased temperatures and variable water availability.

Despite these difficulties, Georgia farmers are already incorporating new farming techniques to adapt to climate change. Farmers and agricultural professionals are working together to implement smart irrigation technologies that use real-time data from farms to deploy water in a more targeted way [16]. These technologies could help conserve water resources by allowing farmers more control over which areas receive water only when necessary. Other farmers have started growing different crops that better match Georgia's changing climate, such as citrus trees [17]. With the adoption of these and other innovative techniques, Georgia farmers can become more resilient and ensure the longevity of the agriculture sector in Georgia.

Despite the challenges brought on Georgia agriculture by climate change, farmers are learning and adapting. We are already seeing major changes in Georgia due to a changing climate, but with proper collaboration with farmers and the adoption of new techniques, the damage can be minimized, and Georgia farmers can become more resilient.

Resources

4th National Climate Assessment

Report from the U.S. Global Change Program detailing the predicted impacts of climate change on agriculture and the southeast.

University of Georgia Center for Agribusiness and Economic Development

University of Georgia website highlighting the important contributions of agriculture to Georgia's economy.

University of Georgia Cooperative Extension

The UGA Cooperative Extension works with farmers to provide the latest technical and scientific information to improve agriculture throughout the state.

Hurricane Preparation and Recovery Commodity Guides

US Department of Agriculture guides to getting ready for and recovering from hurricanes by commodity and state across the Southeast US.

Climate Indicators for Agriculture

US Department of Agriculture guide to how different climate indicators like frost date, heat waves, and high humidity affect crops and livestock around the country and how they are changing over time.

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