THE ECONOMIC IMPACTS OF CLIMATE CHANGE IN FLORIDA'S RURAL AGRICULTURAL AREAS

THE CASE OF HURRICANE IAN

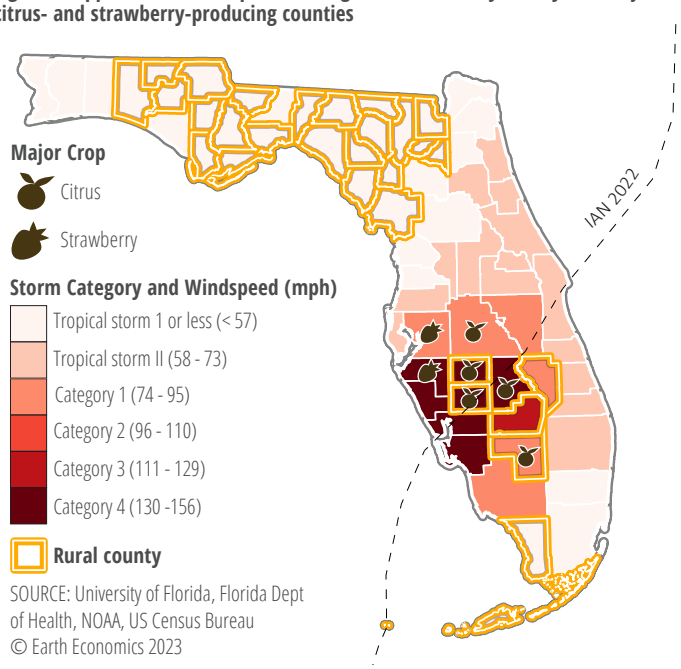
ENVIRONMENTAL DEFENSE FUND - FLORIDA | 2023

Florida's 33 rural counties[i] are important to the state's economy and way of life.[1] Together, they cover about a third of the state and are home to over 6 percent of the state's population (1.3 million residents). Yet, because their economies are typically tied to just one or two sectors (most commonly, agriculture and tourism) when these sectors experience shocks, it takes them longer to recover—**rural counties are more economically vulnerable to hurricanes than urban counties.[2]**

Agriculture is critically important to rural Florida counties, providing up to a third of a county's GDP.[3] The most recent USDA data shows annual crop sales of over $1.2 billion in rural counties, with livestock and related products accounting for $1.1 billion in revenue each year.[4] Top commodities are sugarcane, oranges, and flowers, though strawberries, tomatoes, and bell peppers are also high-value crops at the farm level.

Hurricane Ian brought unprecedented damage to Florida's rural communities, knocking out power, destroying property, and causing extensive flooding with devastating impacts on agriculture. As it moved inland, Hurricane Ian maintained strength while dumping heavy rains in what could present a new trend. Figure 1 shows Hurricane Ian's path and the average windspeeds by county, a major driver of crop damage.[5]

Figure 1. Approximate windspeeds during Hurricane Ian by county and major citrus- and strawberry-producing counties



SOURCE: University of Florida, Florida Dept of Health, NOAA, US Census Bureau

Hurricane Ian exposed the vulnerability of rural communities, highlighting the need for adaptive climate resilience strategies that include Florida's rural counties.

Hurricane impacts to rural counties are complex. Previous research demonstrated that rural county economies are more susceptible to impacts of hurricanes and other natural disasters than urban counties.[2] Comprehensive climate resilience plans that include rural communities would better address the varied suit of challenges facing the state's vulnerable areas:

- **Biodiversity loss and the pollinator crisis:** About 15 percent of the nation's bee colonies were in the path of Hurricane Ian. Fewer pollinators would likely lead to reduced harvests or higher market prices for Florida's produce.[6]
- **Compromised farm profits:** Florida is the second largest strawberry producing state in the nation. Strawberries need cooler conditions for optimal growth, and high temperatures already impact growers and their supply chains. A recent analysis suggests strawberry farmers will experience an 11 percent yield decline and a 10 percent decrease in net income per acre.[7]
- **Flooding:** Hurricanes are one source of flooding. Scientists expect more severe storms in the future.[8] When paired with other impacts from climate change (like sea level rise), heavy rains that come with hurricanes can be devastating and will likely make future flooding worse.[9]
- **Energy and the cost of living:** A recent study found that Florida's rural communities face higher energy costs.[10] Extreme climate events can shock the state's energy grid, likely leading to increases in energy costs and widened existing disparities.

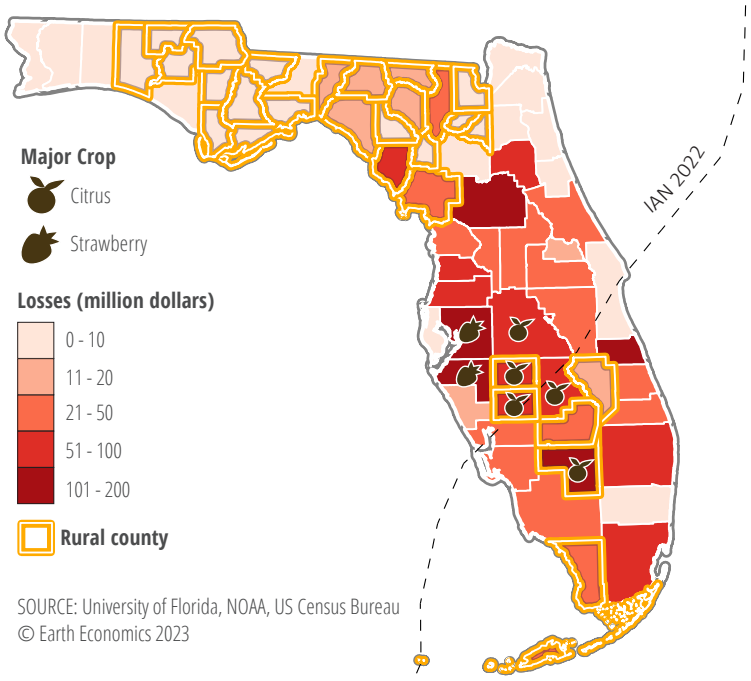
[i] The State of Florida defines rural as: a county with a population of 75,000 or less; a county with a population of 125,000 or less which is contiguous to a county of 75,000 or less; any municipality within a county as described above (Section 288.0656, Florida Statutes).

RURAL COUNTIES WERE DISPROPORTIONATELY IMPACTED BY HURRICANE IAN

Tropical storms and hurricanes often affect perishable products, as when fields are flooded, or harvested items must be dumped after power outages shut down cold storage facilities. These events may also affect market prices, for instance when storms degrade product quality. Finally, hurricanes often damage farm buildings, equipment, livestock, and perennial crops such as citrus and vineyards.

University of Florida researchers used wind speed, precipitation, and flooding to estimate over $2 billion in crop losses from Hurricane Ian.[5] Figure 2 shows the distribution of losses to selected commodities, with **rural counties in the hurricane's path experiencing 37 percent of the total estimated crop losses across the state.** These impacts are disproportionate, given that only 6 percent of the population live in these counties.

Figure 2. Estimated agricultural losses from Hurricane Ian by county (in million USD 2022) and major citrus- and strawberry-producing counties



SOURCE: University of Florida, NOAA, US Census Bureau

"Florida's citrus crop forecast is the lowest in nearly 100 years, recent hurricanes are a major factor."[12]

RECENT HURRICANES AND THE CITRUS INDUSTRY

Since 2017, three major hurricanes hit Florida. This frequency does not allow time for citrus trees to fully recover, amplifying hurricane impacts over time. The result has a two-part effect on citrus plantations: first, fruits are blown off trees and spoil, and then the trees can be severely damaged, requiring years to recover—sometimes requiring replacement. Perennial crops, like oranges, are more vulnerable to strong winds and take longer to recover. A typical citrus crop takes two seasons to recover from a category 4 hurricane,[11] but producers may suffer more enduring economic losses.

Hurricane Ian has been the costliest storm in Florida's history, directly striking some of the major citrus producing rural counties. Citrus provides the greatest economic value for Florida producers. Given that hurricane strength is expected to increase with climate change, **Florida's agricultural sector is likely to become increasingly vulnerable to hurricane impacts.**

1 Section 288.0656, Florida Statues. Updated February 2023. The list is available at: www.floridahealth.gov/programs-and-services/community-health/rural-health/_documents/Florida_Rural_Counties_2020_Census.pdf

2 Earth Economics (2021). The Economic Impacts of Climate Change in Florida's Rural Areas.

3 Bureau of Economic Analysis (2021). Available at: www.bea.gov/data/gdp/gdp-industry

4 USDA National Agricultural Statistics Service (2017). NASS - Quick Stats. USDA National Agricultural Statistics Service. Available at: https://data.nal.usda.gov/dataset/nass-quick-stats.

5 Court et al. (2023). Estimated Agricultural Losses Resulting from Hurricane Ian. University of Florida Economic Impact Analysis Program.

6 University of South Florida (2023). Available at: https://wusfnews.wusf.usf.edu/economy-business/2022-10-12/florida-bee-colonies-destroyed-by-hurricane-ian-smashed-drowned-starving

7 Environmental Defense Fund (2023). Understanding Climate Change Impacts on Florida Strawberries Agriculture. Available at: https://npr.brightspotcdn.com/ea/7b/e63b7d494379a0b0d9345cd250e3/edf-florida-fruits-veg-2023.pdf

8 National Aeronautics and Space Administration (2022). A Force of Nature: Hurricanes in a Changing Climate. Available at: https://climate.nasa.gov/news/3184/a-force-of-nature-hurricanes-in-a-changing-climate/

9 National Oceanic and Atmospheric Administration (2023). Global Warming and Hurricanes. Available at: www.gfdl.noaa.gov/global-warming-and-hurricanes/

10 Florida Department of Agriculture and Consumer Services (2023). A Study of Energy Equity Within Florida. Report available at: www.fdacs.gov/ezs3download/download/106272/2738517/Media/Files/Energy-Files/FDACS-Study-of-Energy-Equity-within-Florida-Final-Report-Web-Version/FDACS-Study-of-Energy-Equity-within-Florida-Final-Report-Web-Version.pdf

11 The News Service of Florida. (2022, October 3). Florida citrus growers face a 'gamut of damages' from Hurricane Ian [PBS & NPR for Southwest Florida]. WGCU. https://news.wgcu.org/2022-10-03/florida-citrus-growers-face-a-gamut-of-damages-from-hurricane-ian

12 U.S. Department of Agriculture (2023). May Issue. www.nass.usda.gov/Statistics_by_State/Florida/Publications/Citrus/Citrus_Forecast/2022-23/cit0523.pdf

This project was completed by Earth Economics in partnership with EDF.

EARTH ECONOMICS

Environmental Defense Fund