



2023

# State of Agricultural Weather Challenges Report



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# Purpose & Methodology

## WHY WE CREATED THIS REPORT:

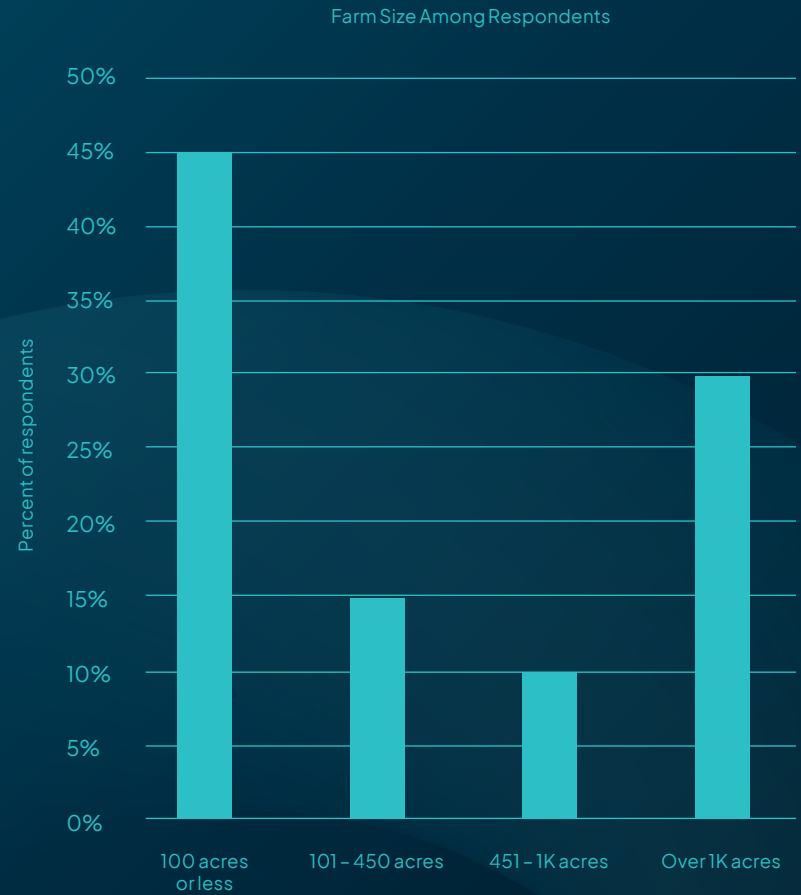
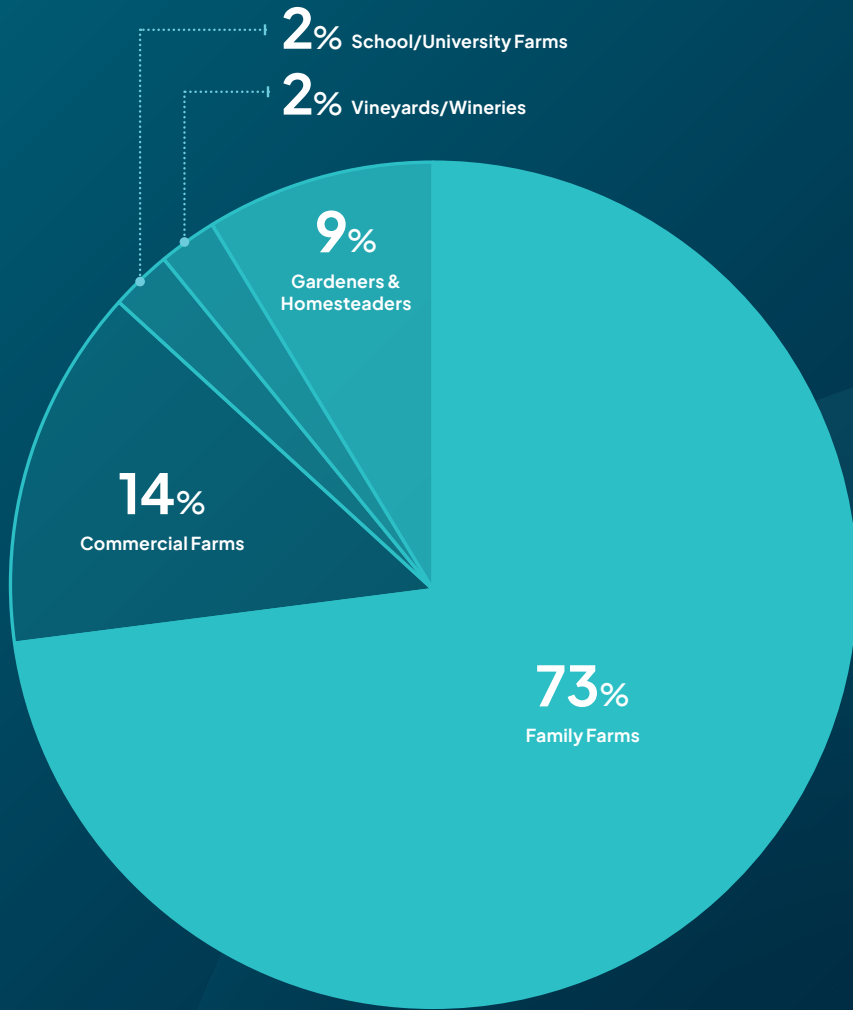
- Build a ground-level understanding of how growing weather challenges are affecting agriculture
- Identify and segment the community of agriculture professionals engaged in discussions about weather tech
- Gain insights into weather tech utilization across agriculture in North America

## HOW WE CREATED THIS REPORT:

- Invited our friends, colleagues, customers, and contacts in the agriculture business to complete a fifteen-question survey
- Collected data from 105 active farmers and growers across North America
- Reviewed the data with our team of agriculture specialists and mined for deeper insights

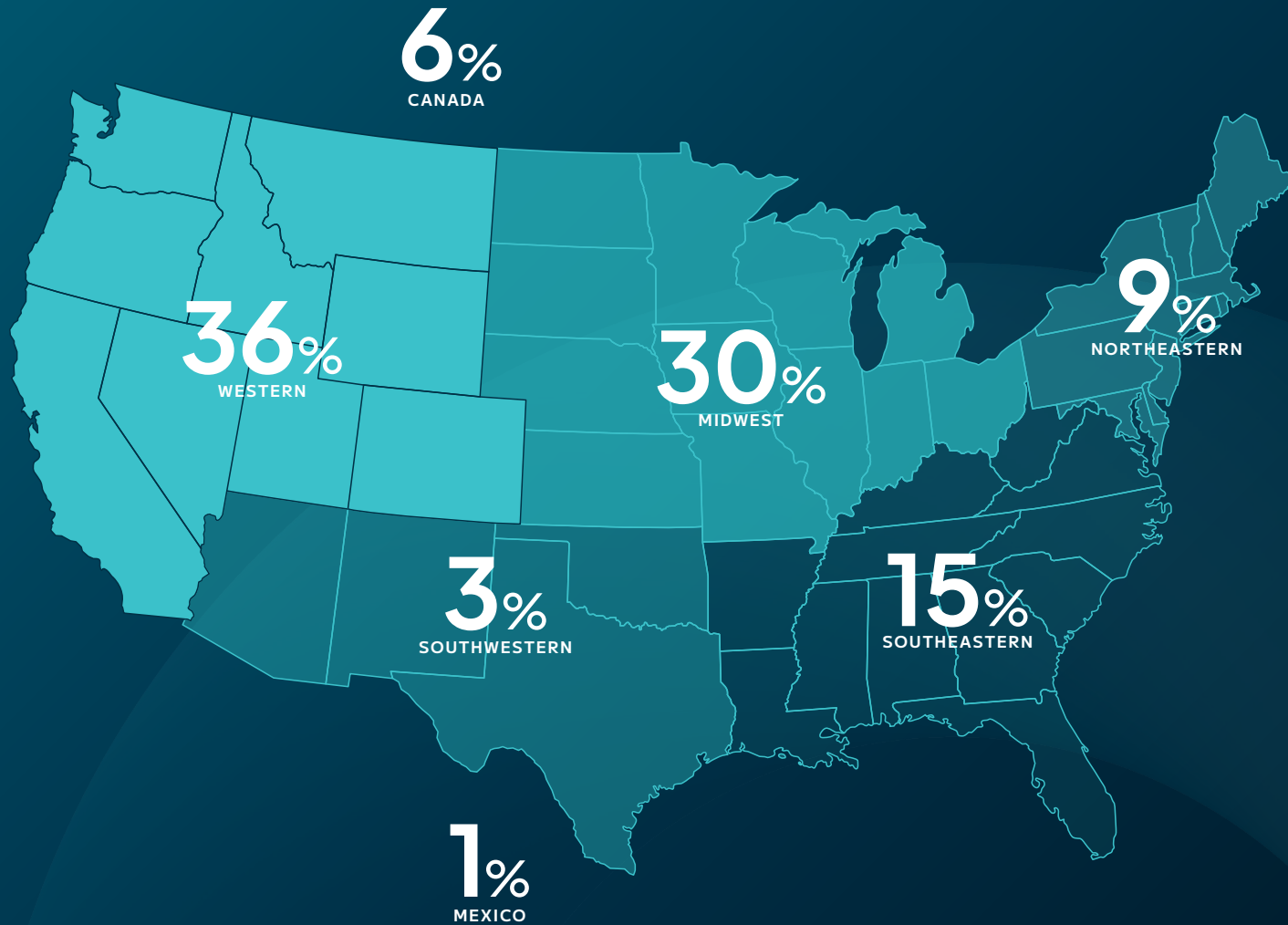


# Meet the Growers: Who are they?

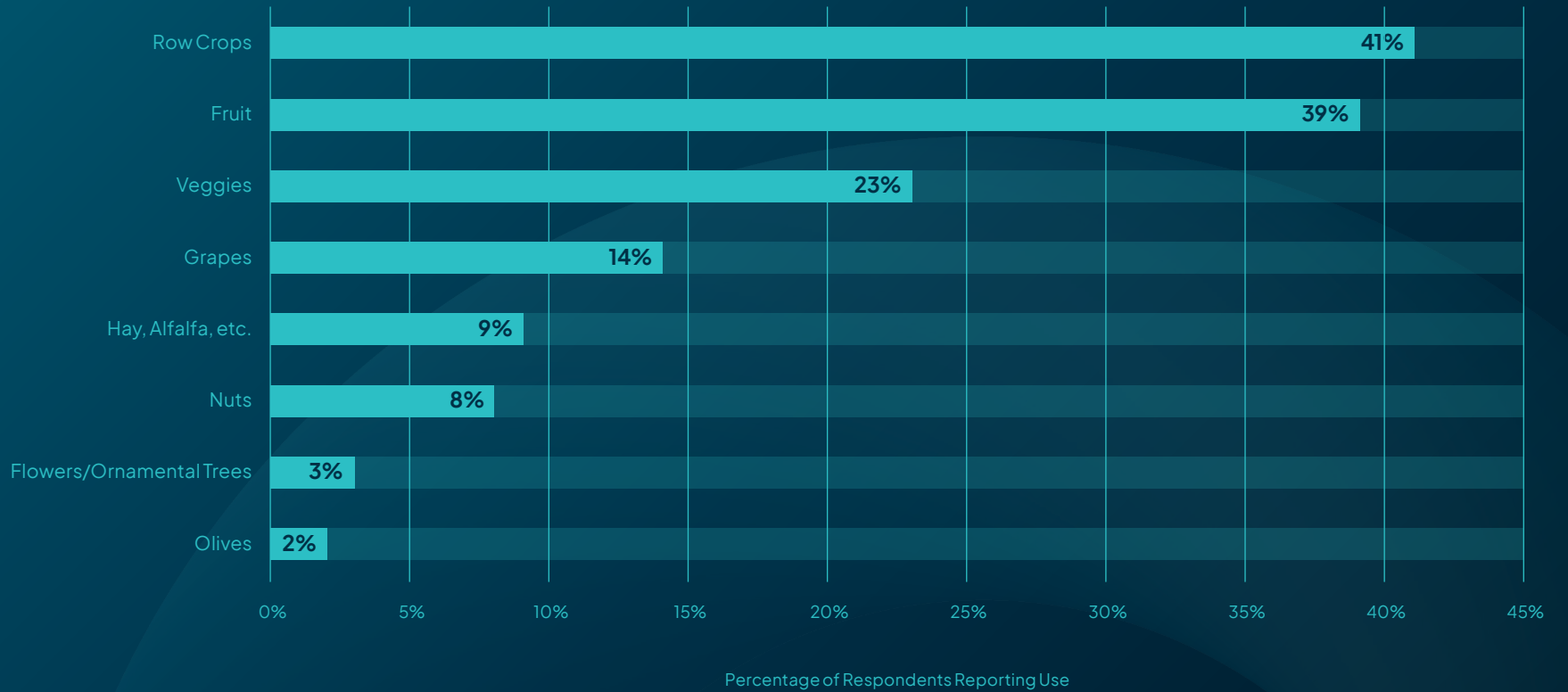




# Meet the Growers: Where are they located?



# Meet the Growers: Crop representation on responding farms



## Weather as a Leading Agricultural Challenge

### Top current challenges, as identified by the pool:

	Weather & Climate Challenges	Labor Cost/ Availability	Fertilizer & Seed Cost/ Availability	Pest & Fungus Mitigation	Regulatory Compliance	Worker Safety
Biggest Challenge	40%	28%	14%	10%	5%	5%
#2 Challenge	35%	18%	21%	17%	8%	1%
#3 Challenge	11%	22%	23%	19%	14%	10%
#4 Challenge	6%	8%	15%	33%	14%	23%
#5 Challenge	8%	19%	11%	10%	20%	31%
#6 Challenge	0%	5%	16%	11%	39%	30%

# 75%

of North American growers now consider the weather their #1 or #2 challenge

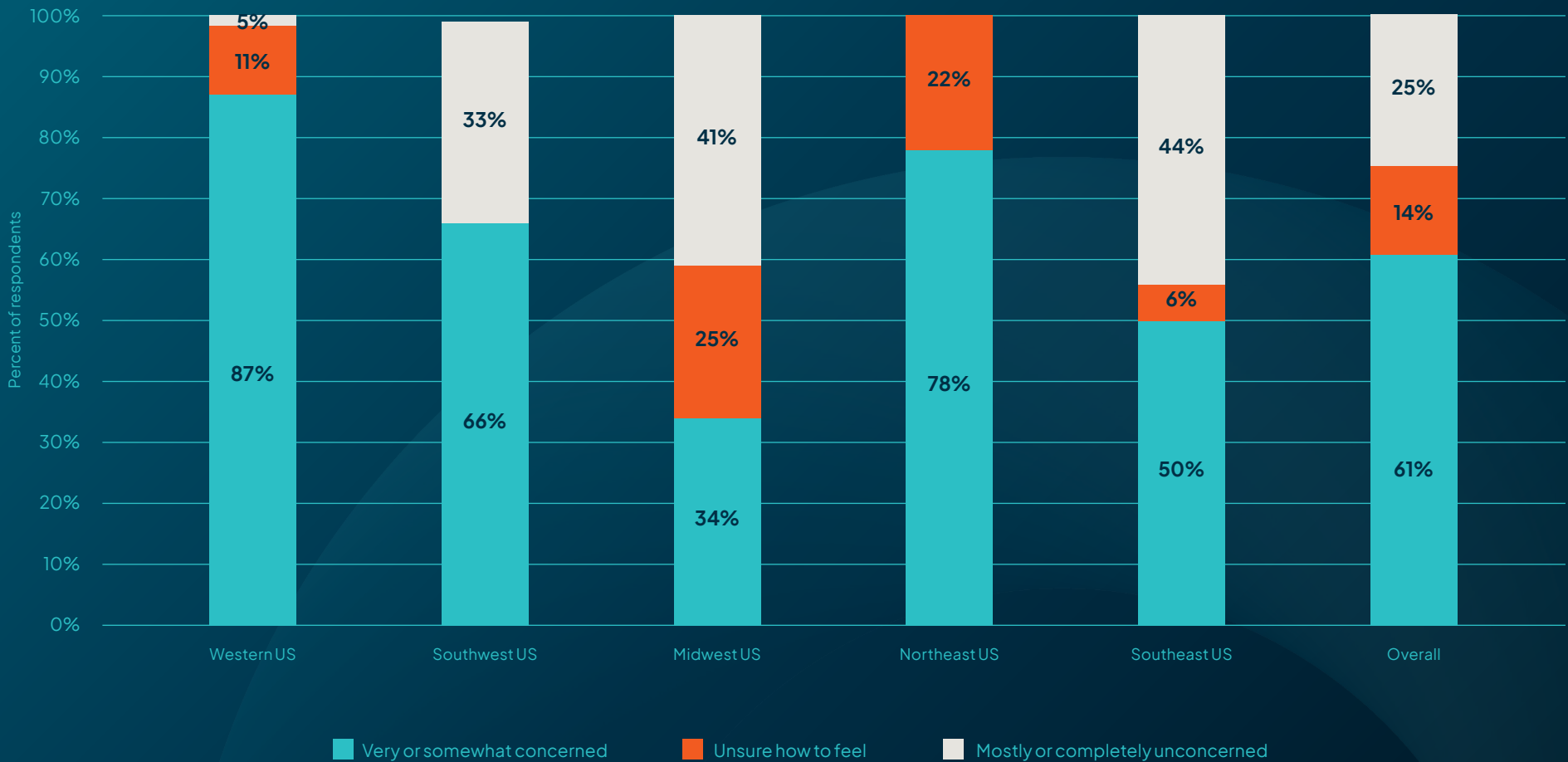
In addition to weather, the rising cost of doing business (labor, fertilizer, and seeds) accounted for the top three challenges

Among respondents who said labor costs and availability were their top challenge, 69% agreed worker safety was their lowest or second-lowest ranking challenge on the list. Investing in worker safety could be an untapped opportunity to make forward-thinking farms more attractive to laborers, helping close the gap in the field.



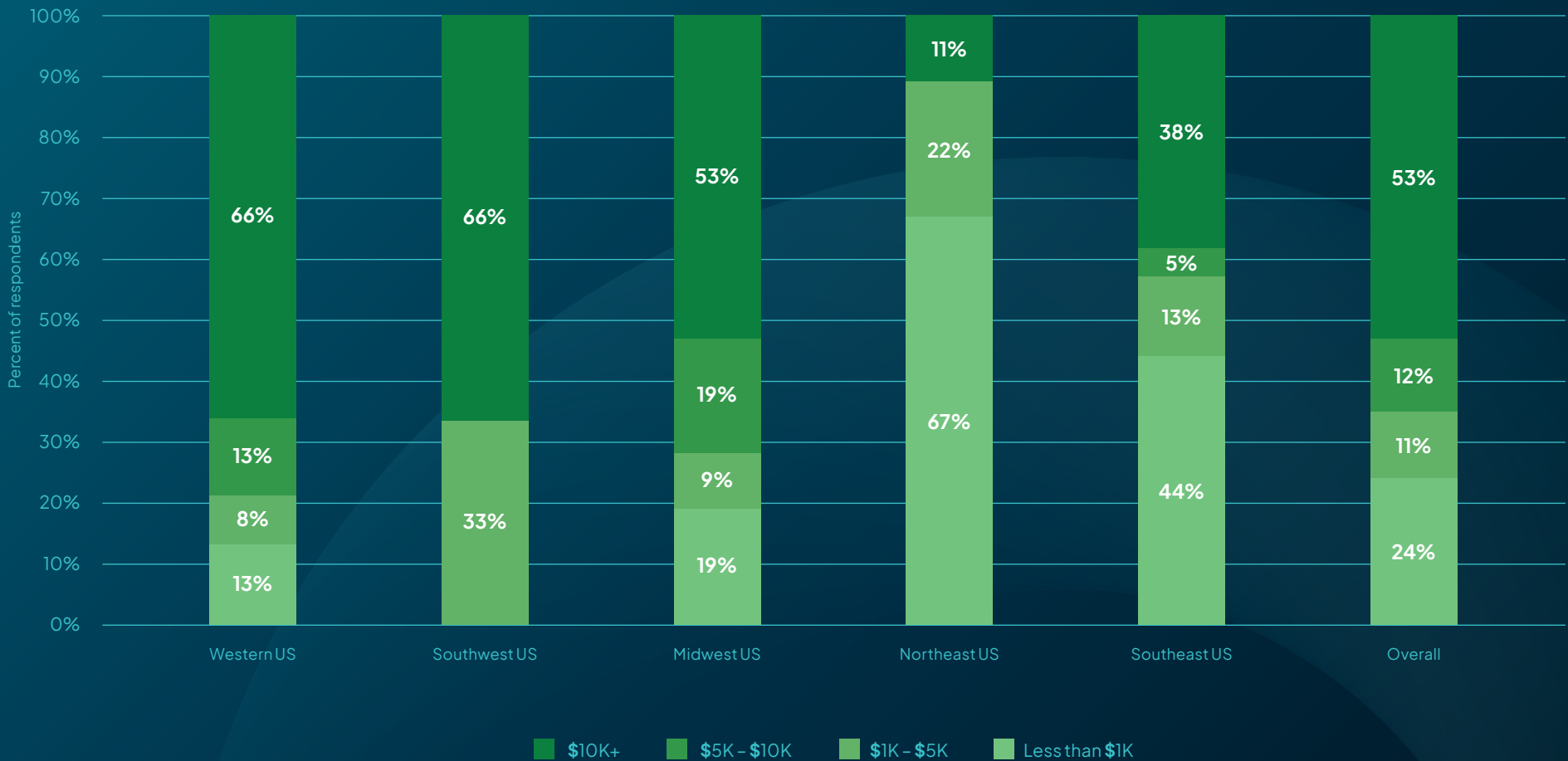
# Weather Challenges

## How concerned are growers about the effects of climate change on agriculture in their region?



# Weather Challenges

## Negative financial impact of weather and climate in the last year



# Weather Challenges

## How does severe weather translate to financial loss?

Here's our farmers' scorecard:

	Reduced Yields/ Crop Loss	Damage to Equipment or Facilities	Lost Workdays	Worker Safety	Increased Pests or Fungi
Biggest/Worst financial impact	85%	3%	3%	1%	9%
Second biggest financial impact	9%	17%	19%	11%	44%
Third biggest financial impact	3%	33%	21%	27%	16%
Fourth biggest financial impact	3%	11%	36%	34%	15%
Fifth biggest financial impact	0%	36%	21%	27%	16%

# 85%

of the growers we surveyed reported crop loss/yield reduction as the costliest impact of severe weather



When we asked (page 7), only 27% of respondents identified pest and fungi mitigation as their biggest or second biggest challenge, but 53% said it was a top-two contributor to losses last year. This suggests pests and fungi could be growing as challenges faster than even those at ground level appreciate.



## Weather Challenges

### What's affecting North America's growers?



83%

are affected by drought



30%

are impacted by increased winds



42%

are impacted by frost and freezing



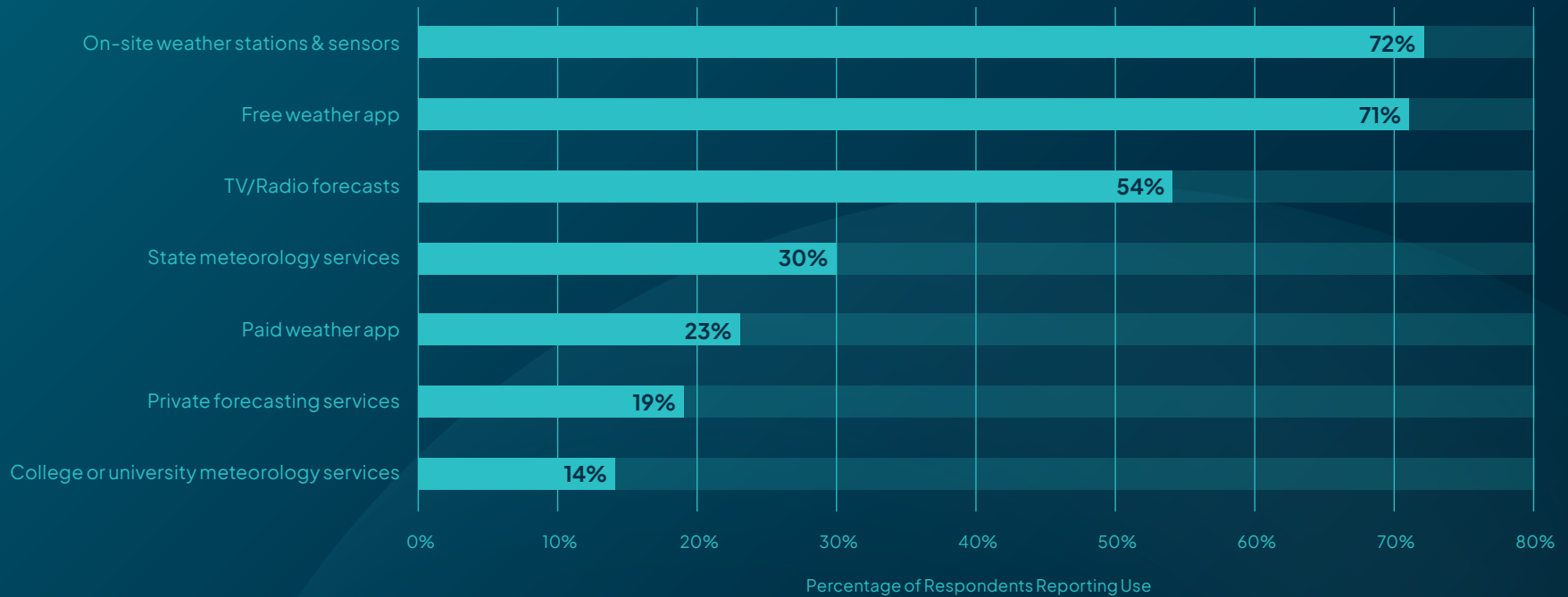
29%

are affected by wildfires or wildfire smoke

59% of the growers we talked to agree drought is their single biggest weather challenge. And while you may think that's just because our respondents skew toward the West, 79% of growers from the Midwest and 50% of the folks we heard from in the Southeast agreed. There's no doubt: **water is precious.**

# Current State of Weather Monitoring & Forecasting in Agriculture

## How are growers getting their weather information?



Free services are great for general information, but more than 70% of our growers agree that on-site devices are essential to getting a complete, specific picture of how weather is impacting operations.

## Current State

# How are farmers getting their hyperlocal environmental data?

70%

own and manage their own weather stations & monitoring sensors

26%

leverage data from a public mesonet

5%

lease weather stations and sensors from a services provider

19%

do not use environmental monitoring data at all

If you're part of the nearly one-in-five farmers who don't have a local monitoring strategy, could leasing devices or contacting your local mesonet operator be an inexpensive path toward a better way?



## Current State

# How are farmers using hyperlocal environmental data?

What percentage of survey respondents use weather data from local stations and sensors to...



Monitor real-time conditions



Optimize irrigation



Forecast frost or calculate chill



Calculate growing degree days



Inform pest management



Optimize fertilization

Our data indicates that growers are comfortable using weather stations and sensors for their main purpose, but most are still not using environmental monitoring data to practice precision agriculture. By utilizing the data they're already gathering better, the majority of farmers can strengthen and improve operations.



# Findings, Recommendations, & the Path Forward

## High-level summary



### CORE FINDINGS & INSIGHTS:

**75%** of surveyed farmers report weather as either their #1 or #2 overall challenge

Approximately **70%** of farmers currently have an on-site weather/environmental monitoring in place, but relatively few are using it in advanced ways to optimize growing operations

Nearly **20%** of growers are not utilizing environmental monitoring data at all



### RECOMMENDATIONS:

Using weather and local environmental monitoring data, farmers can provide better, more tailored field management, leading to:

- Improved weather resiliency
- Better use of water, fertilizer, and seeds
- Smarter use of human workers
- More proactive pest and fungus management
- A more predictable, profitable harvest



# The case for precision agriculture

The USDA Agricultural Research Service defines precision agriculture as “farming based on observing, measuring, and responding to within-field variability via crop management.”

To put it a bit more simply, it’s using a network of measurement and monitoring tools to understand temperatures, moisture, sunlight, and beyond for a variety of specific locations in your field. Instead of envisioning the farm or the field as a single place with a generalized climate, precision ag requires farmers to think about their growing area as a variety of distinct micro-regions and manage each segment in a more tailored way.

That may sound like a lot of work at first, as it requires using tools in new ways and greater attention to detail compared to traditional farming. With that said, growing severe weather challenges are basically making precision agriculture a necessity if farmers are to maintain both production and profitability. Using these tools, growers can allocate resources where they’re needed most and understand their progress toward a profitable harvest in a way that supports business planning.





## The path to precision agriculture

On-site weather and environmental monitoring is good for so much more than watching the weather and measuring rainfall. The data from agricultural weather stations can also be used to deepen growers' knowledge of their crops' progress through the lifecycle and toward harvest.

If you're interested in using weather data to farm more scientifically and improve operational resiliency, AEM's team of agriculture specialists is available to help you embrace precision agriculture at scale.

To start a conversation about how you can use weather data to strengthen your harvest, **contact us today**.

Weather stations and sensors are themselves the grower's best defense against the growing challenge of severe weather. By sending that data to readily available apps, farmers can:

- Maximize investments in water and fertilizer by allocating and timing their delivery based on need and ideal conditions for absorption
- Calculate growing degree days (GDD) to measure progress toward a strong harvest and improve time-sensitive crop management processes
- Measure winter chill accumulation to ensure fruit trees are staying healthy
- Monitor air quality to protect products from smoke taint and keep workers safe in the field when wildfires strike
- Fight pests and fungi more proactively by monitoring plant lifecycle and weather factors to know when they are most likely



For more information, let's talk at:  
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