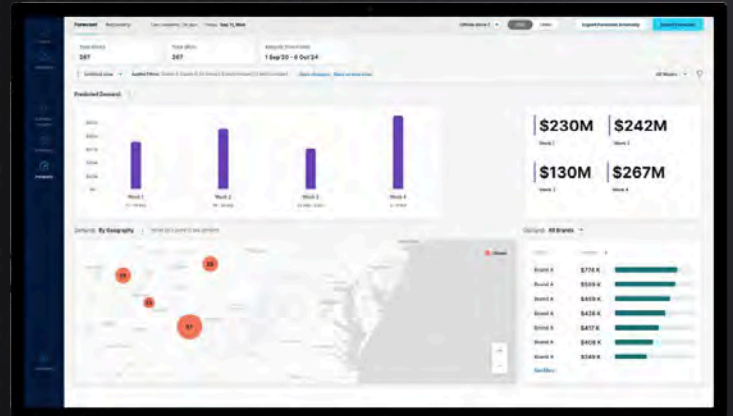# ambee

ClimaChain
in Action

Turning climate volatility into
predictive precision

The challenge

In 2024, a global pharmaceutical major that manufactures and distributes nasal allergy-care products saw an unexpected decline in sales and category share. Allergy cases had risen across multiple U.S. regions, yet sales growth was slow in the first half of the year.

ClimaChain's exploratory analysis of the company's planning showed that existing forecasting tools could not identify shifts in regional allergy demand early enough. The systems relied mainly on historical sales and promotion calendars, often relying on limited and inactionable climate data. This hampered their ability to anticipate the short, climate-driven surges that were beginning to define seasonal demand.

Missed regional demand windows led to inventory pileups in low-risk zones and stock shortages in high-risk areas. These inefficiencies directly affected supply chain responsiveness and reduced the company's ability to capitalize on peak allergy season, resulting in lost sales opportunities and diminished market share.

Key data from H1 2024:

- Sales down by **16%** year-on-year across major markets.

- Stock-outs **doubled** compared to 2023.

- Around **4%** of total annual revenue lost due to low on-shelf unavailability.
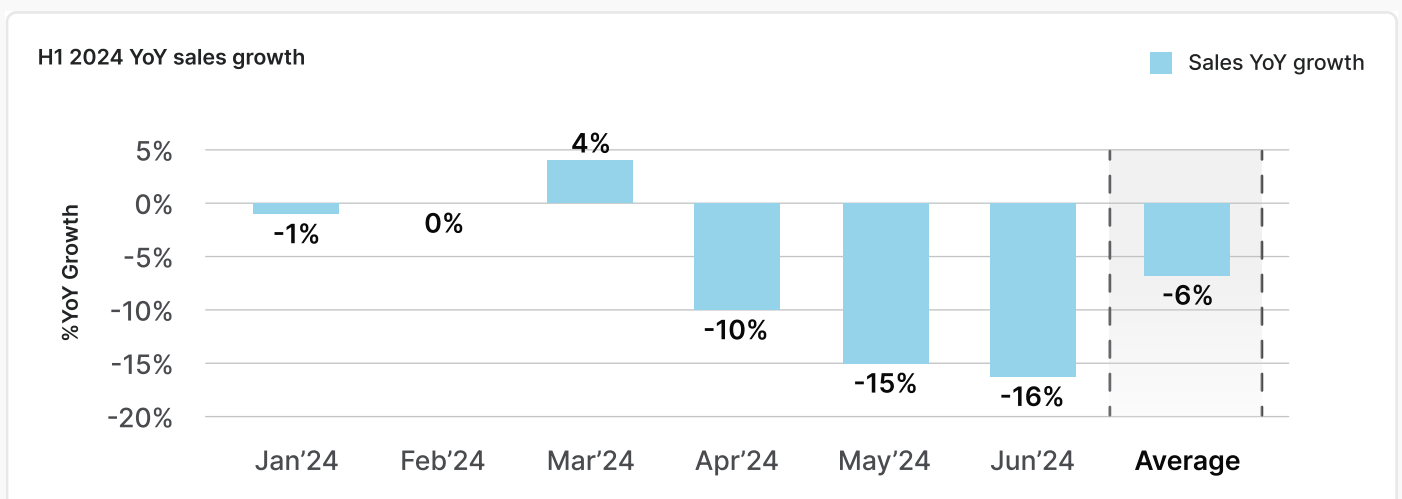

Fig 1. YoY sales decline for nasal spray (H1 '24 compared to H1 '23)

Enter ClimaChain

ClimaChain enabled an integrated analysis of pollen, pollution, and sales data from 2022 to 2024. The findings confirmed that allergy demand did not follow linear seasonality. Instead, it shifted rapidly with local climate and pollen changes.

Store-level analysis showed that inventory imbalances were most severe during moderate-to-high pollen periods. In those weeks, some stores ran out of stock while others carried excess units of the same product.

ClimaChain's analysis confirmed that environmental volatility was the missing variable in the company's demand model.

Across all clusters, around 80% of lost sales occurred during moderate-high pollen days.
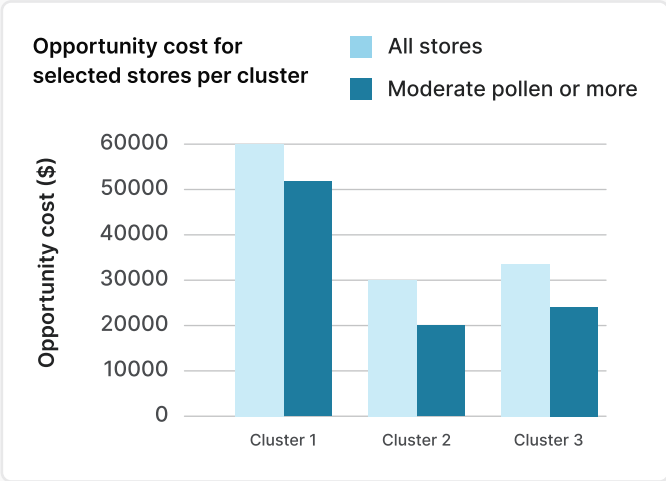
Fig 2. Potential incremental sales missed and corresponding pollen levels

Historical analysis showed a consistent rise in missed sales opportunities from understocking and stock-outs:

- **19%** in 2022
- **29%** in 2023
- **63%** in 2024

The pattern suggested that climate volatility was outpacing the company's static planning models.

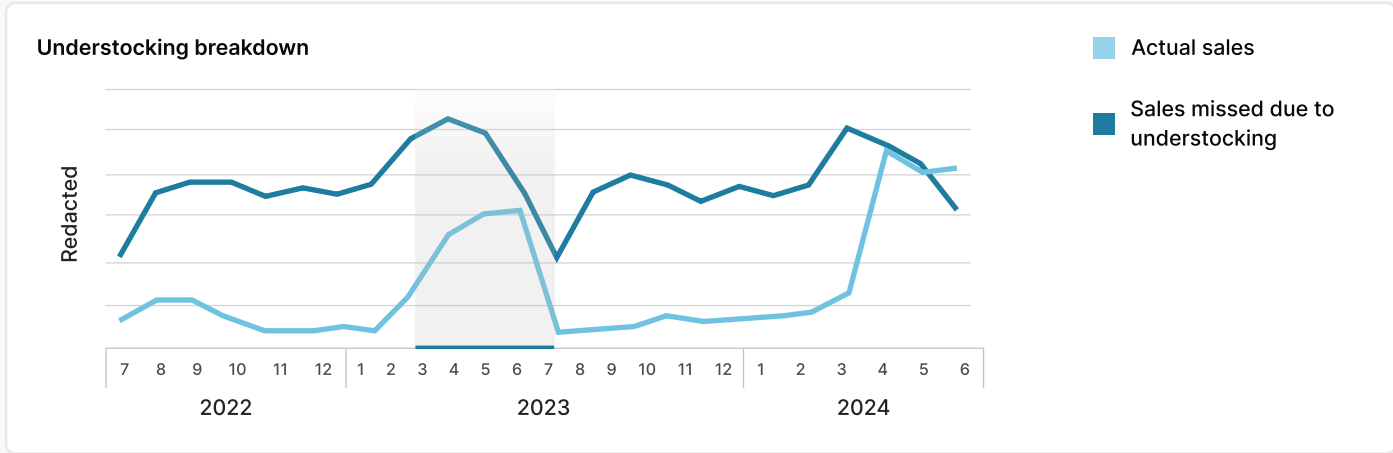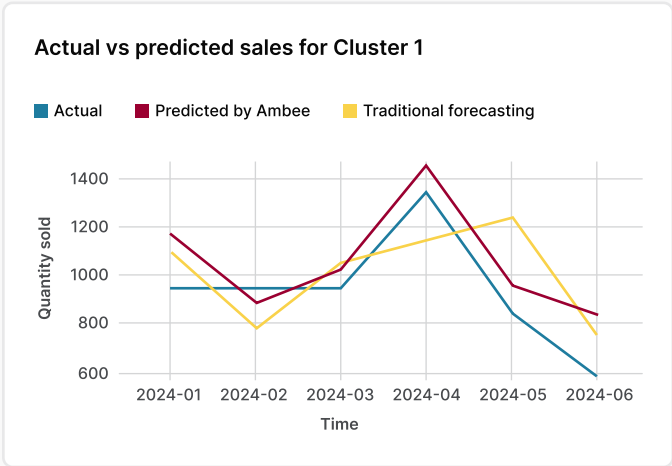| Year	Potential sales lost
2022	19%
2023	29%
2024	63%
Grand total	35%

Fig 3. Monthly understocking trends aligning with pollen peaks.

The integration

The company introduced Ambee's ClimaChain to improve forecast precision. ClimaChain was connected directly to the existing demand planning system without structural change or replacement.

The solution added a hyperlocal forecasting layer powered by long-term pollen, weather, and air quality data. It produced a 30-day rolling forecast that updated weekly for every store and SKU.

47% increase in accuracy by using pollen data in Cluster 1

40.2% increase in accuracy by using pollen data in Cluster 2
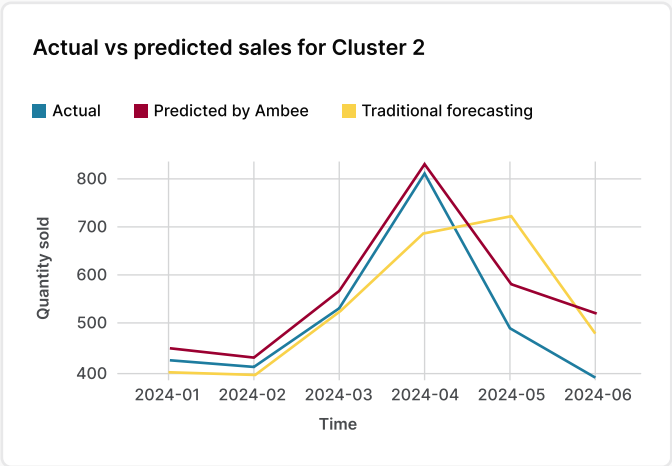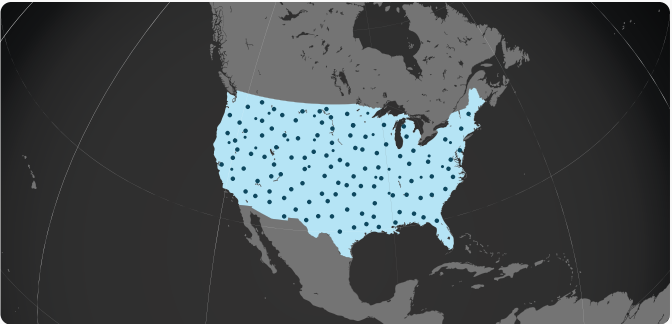

Fig 4. Actual vs predicted sales for clusters

The results

The pilot covered more than 200 retail nodes across the United States. The addition of climate-linked data significantly improved forecast accuracy and on-shelf availability across test clusters.

| Before	After ClimaChain	Impact
Forecasts based only on historical sales	Rolling 30-day climate-driven forecasts and insights	**+40–47%** forecast accuracy improvement
Regional forecasting only	Store-level granularity across all clusters	**50%** reduction in stock-outs during peak allergy periods
Static sales projections	Linked to various climate conditions	**16× ROI** from better sell-through and replenishment
Manual stock redistribution	Automated replenishment recommendations	**5%** reduction in excess inventory
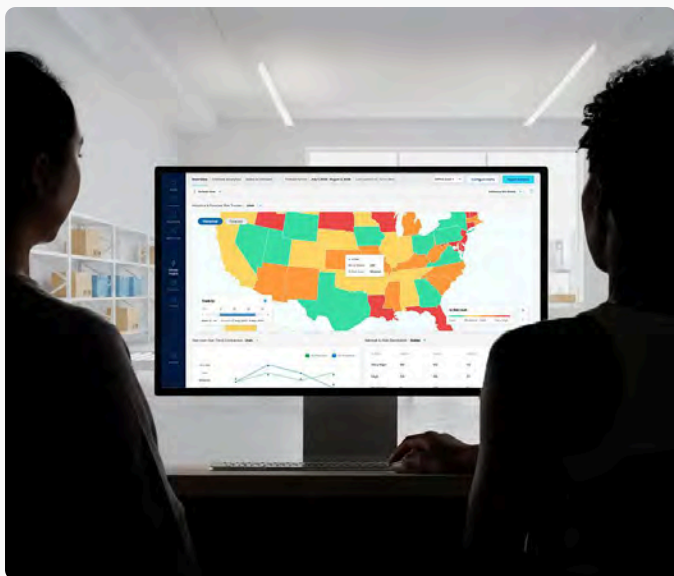
Impact summary:

- Forecast accuracy improved by up to **47%** in high-variance regions.

- Stock-outs reduced by **50%** during allergy peaks.

- Potential incremental sales of **9%** captured through improved availability.

- **16×** return on investment achieved from better demand planning and lower redistribution costs.

ClimaChain today

With ClimaChain integrated into the existing planning framework, the company now builds forecasts using live environmental indicators in addition to historical sales. The process remains familiar to planners, but the output reflects the true dynamics of allergy demand across each geography.

Planning decisions that once relied on seasonal averages are now based on measurable climate signals, giving the business a consistent lead time and meaningful business value.
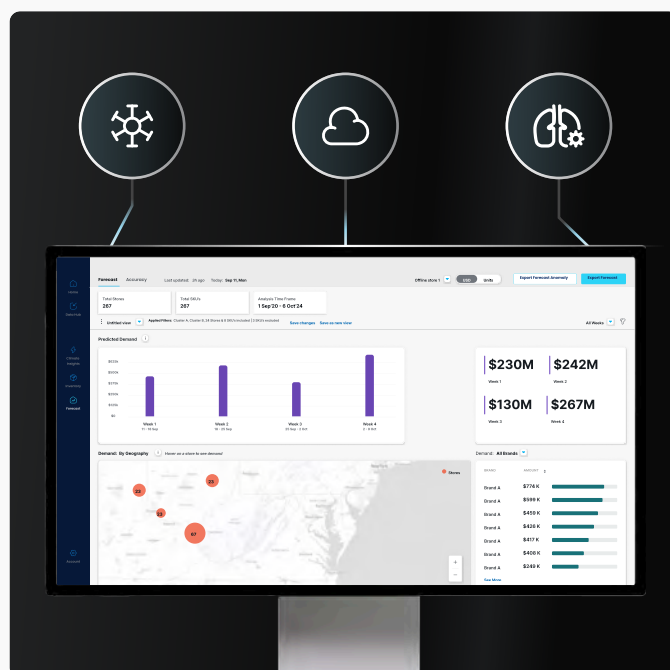
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