Solution

The Yield for Wine

Accurate yield prediction is key to increasing productivity across the wine industry. Yield forecasts are used to manage activities on the vineyard all the way through to the winery. Traditional methods of forecasting rely on sampling, which is expensive, not done extensively enough to truly be representative, and is typically done only twice per season.

The Yield has developed AI/ML models for yield prediction which have the advantage of being more accurate than traditional methods, can be done earlier and are updated regularly to account for the impact of weather — and because our models are powered by AI/ML, they get better with every year of data.

We have AI/ML predictive models for yield quantity, harvest timing and growth stages. Our predictions are used by different roles in our customers' businesses to solve different challenges.

Combined with our Analytics Portal and Mobile apps, The Yield gives growing teams the tools they need to make fast and confident decisions, learn faster and adjust their plans for the impact of weather.

Benefits of The Yield for the Wine Industry

- Improve winery intake
- Secure supply of grapes and reduce cost of contract growing
- Improve on-vineyard crop load management to meet targets
- Increase vineyard productivity by improving yields, reducing cost and mitigating weather-related risk
- Enable data-driven rather than experience-driven decision making

TREASURY WINE ESTATES

"We used The Yield's 18-month forecast to create our forecast and guide our intake plan for the 2023 harvest. As a business we relied on this to share our vintage and grape procurement planning.

V2023 was such an outlier because of a weather pattern we have never experienced before. It was a great test of The Yield's algorithms that will now strengthen the models further."

Anthony Catanzariti

Global, Director of Wine & Grape Sourcing, Treasury Wine Estates

Improve Winery Intake

Winery Intake Planning is challenging for all wineries. It is a massive logistical problem to ensure the right grapes, in the right variety, are brought in at the right time. Grapes need to be processed within 24 hours of harvest. Harvesting is affected by resource constraints and weather.

Early in the vintage, the **winemakers** create a vintage plan to convert all the varieties and quality of grapes they expect to be available into the types of wines they want to match market demand.

Winery **intake schedulers** create a schedule to match the winemakers' vintage plan. They are limited by the capacity of their crushers and fermenters at the relevant wine in processing grapes. They are often taking in grapes of different varieties and quality from different vineyards. Sometimes these are own grown and sometimes they are contract grown.

Harvest schedulers need to make sure the grapes are ripe and in their best condition to get the best outcomes to match in the intake schedule. The have a fixed number of harvesting machines, labor capacity and haulage to get this job done. They also do not want to harvest when raining or during very hot weather.

Vineyard managers and **viticulturalists** are trying to get the best yield and grade for the date when they are likely to be scheduled for harvest and intake to the wineries.

Given the complex set of interlinked plans and decisions, the earlier the predictions, the better people can plan and get the best outcome. But even the best plans can be sidelined by weather events as the season unfolds and need to be constantly updated for the impact of the weather.

By providing earlier, more accurate and more regular yield predictions which are updated for the impact of weather, The Yield gives customers' teams the information they need to make fast and confident decisions. The result is higher-value wine at lower cost with the vineyard assets available.

Secure Supply of Grapes and Reduce Cost of Contracted Growing

Many wineries use contract growers to secure their grapes. It varies by winery — some of our customers are vertically integrated, some only contract grow, and many do a combination of both. Many customers have a baseload of grapes on long-term contracts to secure supply and use short-term contracts to make up any shortfall. Beating the market means having early information on likely yields and timing. Many customers err on the side of oversupply, as they cannot afford the risk of not being able to get the most out of expensive winery plant.

By giving our customers earlier, more accurate and more regular yield predictions which are updated for the impact of weather, they can adjust their contracting strategy to ensure security of supply while reducing costs and waste.

Improve On-Vineyard Crop Load Management to Meet Targets

The vintage plan and contracts for growers set targets for yield and quality. Quantity and quality are constant tradeoffs. Vineyards can make multiple passes to adjust crop load. If a greater than normal yield is predicted, yield growers can choose to reduce the amount of fruit to get better quality.

For example, the first decision is made at winter pruning to set the right number of buds. During the season, vineyard managers can adjust crop load through actions such as cane thinning, bunch thinning and leaf plucking.

By giving our customers earlier, more accurate and more regular yield predictions which are updated for the impact of weather, they can fine-tune their crop load management strategy to get the best return on their growing assets.

How The Yield Solves for Better Yield Prediction

The Yield helps solve a huge logistical problem by using AI/ML to do early and regular yield predictions that adjust for weather to help our customers shape each vintage. The Yield has different wine yield prediction AI/ML models available — for example, predictive models for yield quantity, harvest timing and growth stages. We provide predictions at estate, site, variety, region and block levels.

They are 40% more accurate than using long-term averages and outperform predictions made using traditional sampling methods. AI/ML also improve over time because they learn.

Pre-harvest we provide yield predictions from 18 months before harvest, utilized for planning purposes.

In-season we update the predictions every two weeks allowing plans to be finetuned for the impact of weather events over the season.

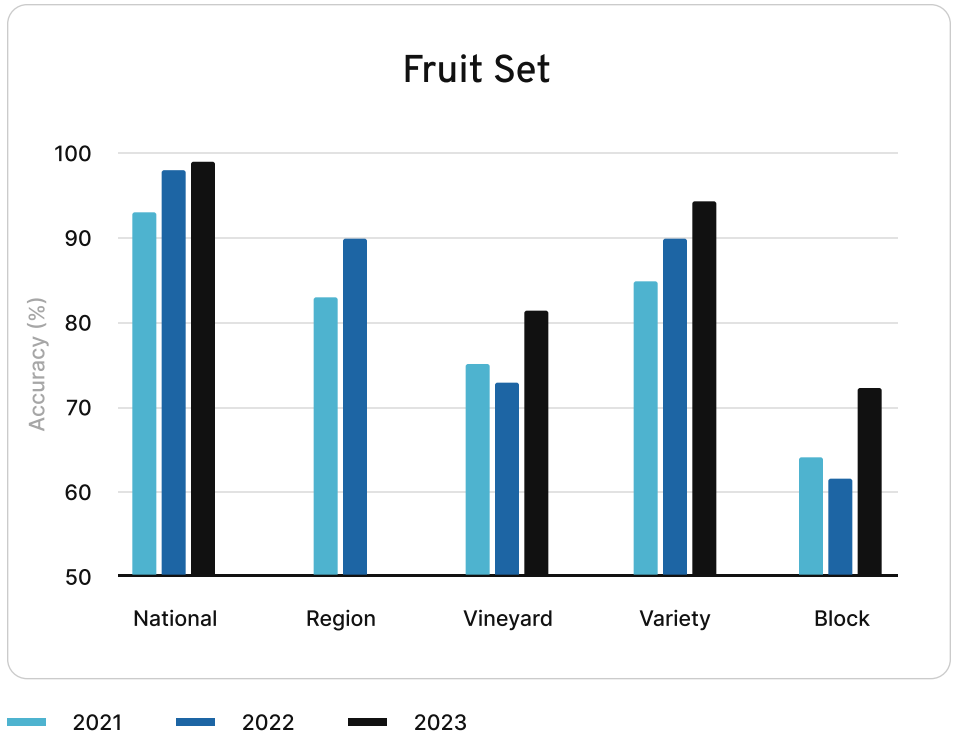
In-harvest our predictions are updated daily for impacts of weather events such as rain and the actual tonnage as it harvested. This gives our customers the up-to-date data they need to get the most out of the vintage in those critical harvest months.

The Yield's predictions can be displayed in our Analytics Portal or sent directly to customers' data warehouses or ERP systems.

The Yield's timing predictions are also highly accurate and respond to the impact of weather. For example, in the major growing district of the Barossa Valley in Australia, we correctly predicted early in the season that the 2023 harvest would be 3 to 4 weeks late due to the impact of lower growing degree days and more rainfall associated with the La Niña weather pattern This gave our customers time to adjust their harvest and intake planning for the vintage. We are seeing the same accuracy in our predictions for wine industry producers in the United States.

The Yield's AI Predictions Improve Over Time

40% More Accurate than Using Long Term Averages



Vineyard managers and viticulturalists set a vintage plan based on targets for quantity and quality. The main levers they use are crop load management (e.g., pruning, cane thinning, bunch thinning), irrigation, crop protection from pest and disease, mitigation of weather events like frost and extreme heat, and harvest scheduling. They are constantly adjusting vineyard practices for weather to get the best possible yields. They then need to adjust their plans due to changes in weather and growing conditions.

These activities are often specific to growth stages and weather dependent. For example, wind during flowering can reduce the potential yield as the number of flowers is reduced. A lot of rain in veraison drives up humidity and the risk of disease. Harvest needs to be scheduled for when the fruit is ready and in periods without rain.

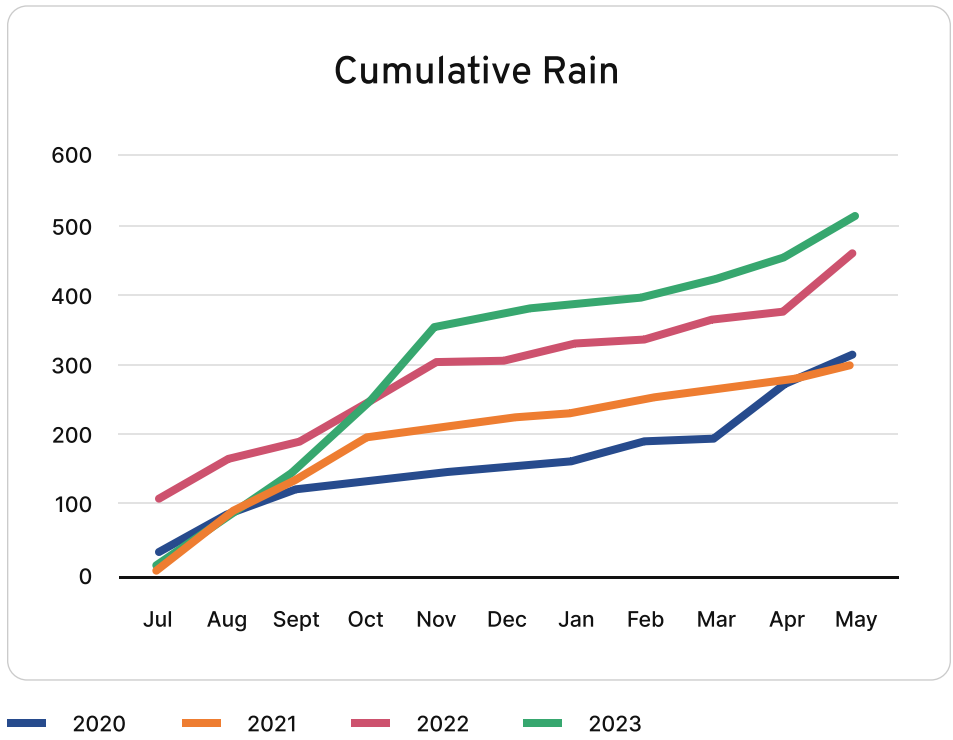
It is a difficult balancing act. Growers are constantly evaluating the season's weather today and want to compare to what happened in similar years. Getting this data in one place is difficult to do and the calculations for things like pest and disease, growing degree days and evapotranspiration used for irrigation are complex. Collaboration is made harder if your colleagues are all using different weather apps and the weather you are looking at is not specific to the location of the vineyard.

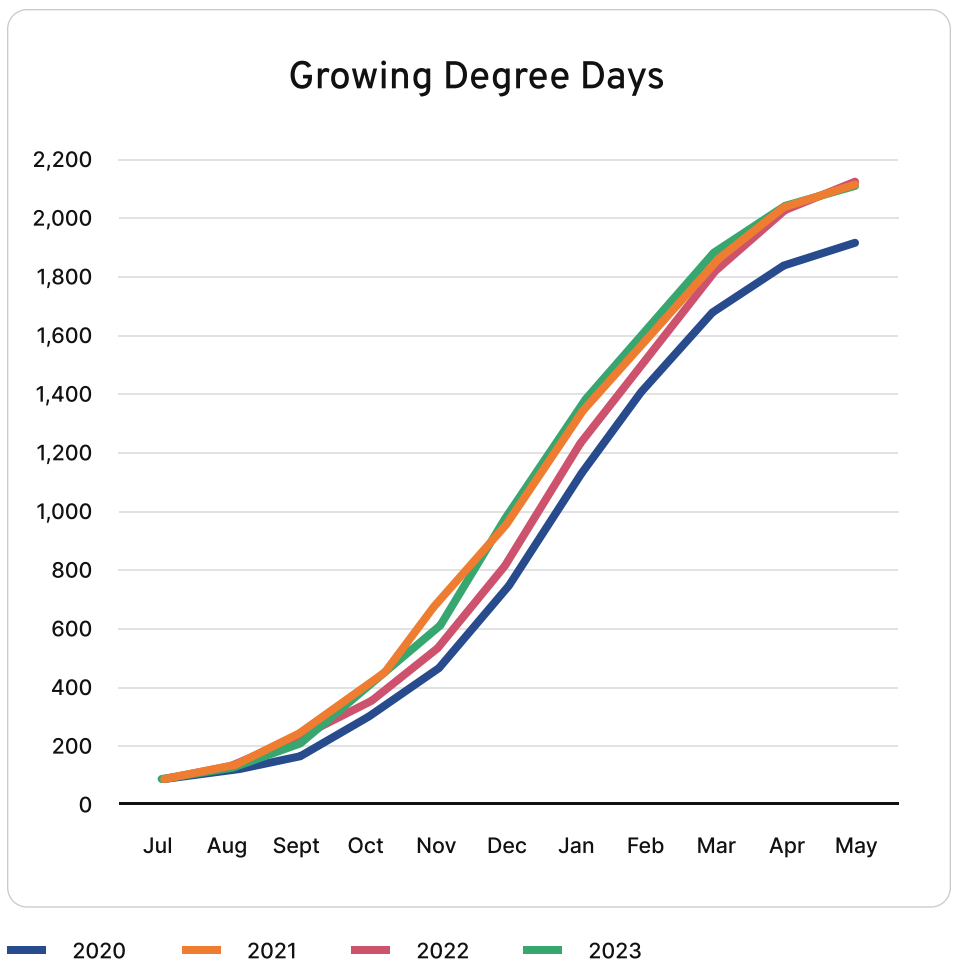
In The Yield's **Analytics Portal** we take available data sets — such as historical yield data (tonnage, quality and timing of harvest), counts and growth stages — and overlay it with historical weather at our customers' vineyards across their portfolios. If the customer is using our yield prediction service, they can also check in on changes in predicted yield based on the impact of weather.

This allows growing teams to look at similar seasons in the past, what they did and what outcomes they achieved. This is particularly important when growing teams needs to adjust their plans for weather events. For example, if there has been a lot of wind at flowering, widespread frost, lower growing degree days after fruit set or rain during harvest.

Australian 2023 ~3–4 Weeks Late and 30–40% Down

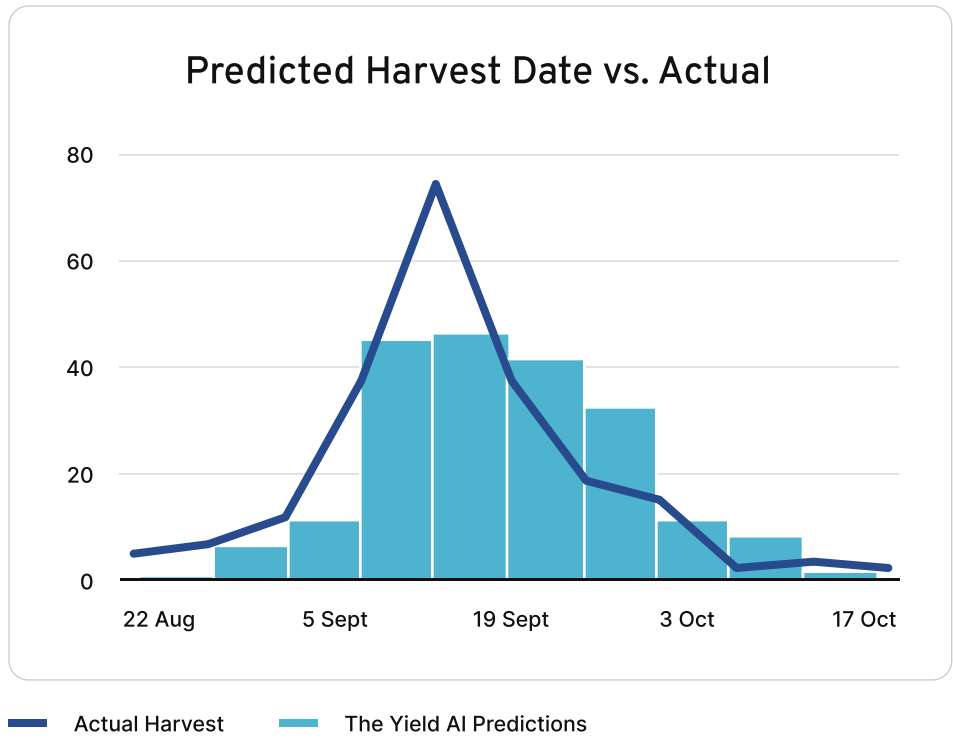
Example of the Impact on La Nina in Barossa (2021–2023)

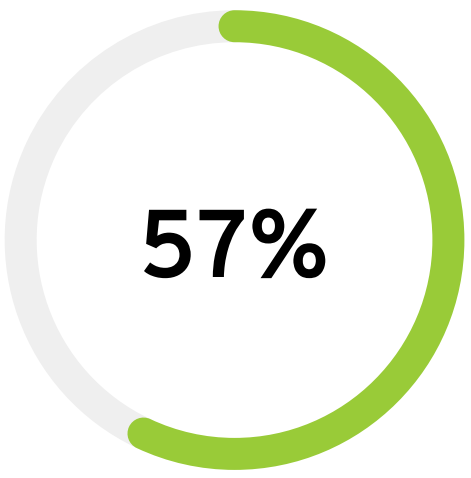




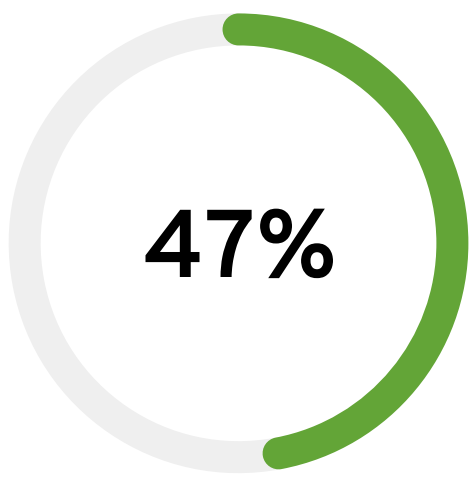
Using our wine-specific **On-Farm Playbook**, vineyard teams can access the best practices to achieve quality and yield targets and mitigate risks such as weather events, pests and disease. Our recommendations do all the complex calculations and adjust for local growing conditions. For example, using the combined disease risk, spray and agchem recommendations, vineyard operators can adjust spray programs and dosage rates to get the best outcomes at a lower cost.

Adding weather stations and using microclimate predictions in our platform, you can further increase accuracy. For example, in a trial with over 100 sites we saw an increase of 47% in safe spray windows, giving more time for operational teams to get critical sprays done. Because we can tell customers the uplift for their operational decisions of using either standard weather forecasts vs. using microclimate predictions, they can make a cost-benefit decision on if and where they want to add weather stations and sensors.





Reduction in ETO measured water requirements.



Increase in safe spray windows.

Better extreme weather event identification.

Data source: ~100 sites across ANZ 1.5 square mile grid for gridded weather product. Extreme weather event analysis includes extreme heat and frost events.

Contact us to learn more.

Contact us