

How wineries in India are adapting to warmer winters and erratic rain

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- *The delicate chemistry of grapes and the conditions they are grown in, is crucial in viticulture. This is a challenge to achieve in a tropical country like India.*
- *Erratic rainfall, sudden hot days, and receding summers pose a threat to this balance, and consequently, winemaking.*



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“As a child, I used to shiver while cycling to school between the months of November and January; Nashik used to be a cold travel destination. Now, it has become significantly warmer,” says Kaushal Khairnar, winemaker at Chandon India, which has its vineyard in Nashik. In a different part of the city, Sanket Gawand also admits that December of 2022 was the hottest he has experienced so far. As a viticulturist with a boutique winery named Vallonne, it worries him because “depending on the climate, the quality of the grape varies and subsequently the wine. So, climate is a crucial factor of winemaking.”

Nashik, located in the northwestern part of Maharashtra, is a major winemaking region of India. At 700 metres above sea level, Nashik’s temperature during the day, clayey laterite soil, as well as the monsoon season makes it ideal for winemaking. Besides Nashik, Maharashtra’s Solapur and parts of Karnataka also support viticulture, which is the cultivation and harvesting of grapes.



Vallone vineyard in Nashik. Warmer winters are a concern for wineries in this region as the weather changes impact the quality of the grape and subsequently the wine. Photo by Shubhanjana Das.

Manjunath V.G., a viticulturist and vice president of a Karnataka vineyard and winery, Grover Zampa, added that to attain good phenolic maturity in the grapes, the region should have day temperatures of no more than 33-35 degrees Celsius, especially during the ripening season. This balance is crucial to make a well-rounded wine, which is dictated by two kinds of maturities in the grapes – theoretical maturity, which consists of sugars and pH, and phenolic maturity which refers to the skin, seed, and tannin. The quality of the grapes, and consequently wine, is a direct reflection of numerous environmental factors such as rainfall, humidity, heat, and fog, all of which comes under the umbrella term ‘terroir’. Ideal terroir reflects in the wine quality which boils down to three aspects: sugar, acid, and secondary compounds which develop over the season.

Climate issues pouring in for India’s winemakers



However, the current climatic reality is shifting farther from the ideal conditions.

“In India, majority of the grape vineyards are located in semiarid climate. Climate change may aggravate the already serious problems of irrigation water availability and salinity,” states a chapter titled *Effect of Climate Change on Grape and Its Value-Added Products* in the book *Climate-Resilient Horticulture: Adaptation and Mitigation Strategies*, edited by researchers from Indian Council of Agricultural Research and Indian Institute of Horticultural Research. It also says about wine grapes, “Higher temperature may advance the

ripening of berries and alter the berry composition in both table and wine grapes, thereby affecting the quality of the produce.”



Harvesting the grapes. Representative image. Higher temperatures may advance the ripening of the berries, thereby affecting the quality of the produce. Photo by Larry Koester/Flickr.

One of the contributors to the book and the principal scientist (horticultural sciences) at ICAR-National Research Center for Grapes is Ajay Kumar Sharma. Stressing on the same, he said that climate change manifestations are “definitely a threat to India’s wine regions, owing to higher humidity and anomalous temperature conditions; uneven phenolic maturity, among other things, will eventually impact how the wine tastes.”

Unexpected weather events challenging for viticulturists

Khairnar, Manjunath, and Gawand say erratic rainfall and receding summers pose a threat to winemaking in India, where the framework is opposite to that of traditional, temperate winemaking regions that harvest before the winter dormancy hits the plants. India harvests before the summer season.

Owing to receding summers and unusually hot days, viticulturists often have to advance their pruning and harvest early. “In Nashik, we prune around the end of monsoon which is when you have the October heat. But that was missing in 2022 owing to prolonged monsoon which was followed by a temperature drop. It was good until mid-November, after which the temperature started increasing suddenly,” Gawand told Mongabay-India during an interview at the end of 2022. As a result, the uniformity in maturity of the berries is lacking this year, he added, while showing certain berries that are green, some pink, while some have started turning red. This equals to different phenological phases from a single line of plants, meaning, the ones that sprouted later will not be as good as the ones that sprouted earlier, thereby affecting the whole batch.



A bunch of Cabernet Sauvignon grapes at the Vallonne vineyard have matured unequally. The season in 2022 saw a prolonged monsoon and sudden temperature increase which disrupted the uniformity in maturity. Photo by Shubhanjana Das.

Gawand further says that due to the sudden increase in temperature around mid or end of February, the berries ripen faster and the sugar level tends to increase faster than phenolic maturity. "That is why the alcohol level is slightly higher in some of our reds," he adds. "Just by tasting the wine you can tell if the vintage was a cooler or warmer one. So, we try to achieve a balance of all things in our wines. Our aim is to reduce the gap between the phenolic and theoretical maturities, despite climatic changes."

Apart from receding summers, erratic monsoons, too, are a cause of concern for viticulturists. In Maharashtra, Khairnar noted, monsoon would arrive a few days after Kerala, during which it would rain over a span of time in small quantities. In recent years, not only does monsoon arrive late, but it also pours in brief spells, affecting the soil, as incessant rainfall and erosion robs its nutrient characteristics. Add to that, a new trend of return monsoon during the flowering stage of the grape in the months of November and December which defies how the winemaking cycle was designed in India. "If it rains or the humidity is high during the flowering stage, which is crucial for wine, you will lose almost 30-40% of the crop with the falling flowers," says Khairnar. "In 2021, we did not have so much rainfall during the monsoon, but the back monsoon was intense. This is not normal. It poses a threat of mildew attack which can make you sacrifice in terms of spraying or sometimes, the quality."

Solapur, in the southeastern part of Maharashtra, is also known for its vineyards, one of them being that of Fratelli's. Solapur has also been facing erratic rainfall and a trend of high humidity in the past few years. According to the India Meteorological Department's (IMD) rainfall departure data from Solapur, rainfall in 2019 was deficient (-38% departure from normal), excess in 2020 (25%) and 2021 (59%) and normal in 2022 (5%).

Alessio Secci, one of the founders of Fratelli, explained this with a spectrum of two extremes of rainfall conditions in Akluj, which is where the Fratelli vineyard is located: In 2016, there was no monsoon in Akluj. The water supply for irrigation was also restricted as the Pune dam, which is the source of water for Akluj, was half empty, and water was given only once every 15 days. That year, Fratelli's 250 acres of vineyard yielded 135 tonnes of grapes, as opposed to its usual 400-450 tonnes. Secci cited this as "a huge sacrifice and a wake-up call to face the issue of climate change in wine making."

However, in the last two years, the average rainfall has doubled. According to Fratelli's data, in 2009, Akluj received 450-500 mm of rain between June and September. In 2021, it reached 1,000 mm, while in 2022, the rainfall received was at 750-780 mm. "If it rains a lot during September, October and November, it exposes the berries to fungus diseases," Secci said.

As a young wine-making country which is barely two decades old, India also lacks highly accurate long term weather information and timely updates from local weather stations, ideally where vineyards are located, for disease forecasting in terms of mildew pressure. There is also a lack of micro-climatic data from a centralised governing body to better prepare Indian wineries for the vicissitudes of climate change. Wineries such as Chandon India and Fratelli are, therefore, invested in installing weather stations in their vineyards to better study the trends of climate change and ways to incorporate that into their winemaking. "It is important to have data-driven solutions," notes Secci. "We also have to be quick to understand weather trends because if the weather changes, everything will change. We might make better or worse wine. But it is important to understand the terroir and try to adapt as much as possible."

Adaptability is key

The lack of a governing wine industry body (such as the INAO: the Institut National de l'Origine et de la Qualité in France) also means lack of appellations like in traditional wine countries, which many winemakers like Khairnar see as an opportunity. They can experiment with new viticultural practices, heat and humidity-resistant grape varieties, and even migrate to different climatic zones of India which are cooler than the current wine-growing regions. "Unlike traditional regions such as France and Italy, we are not a terroir-regulated country. This gives us the opportunity to create something new and create history," said Khairnar, who, like many winemakers, thinks adaptability is key to continuing making good wines.



A vineyard in Pune district, Maharashtra, India has a young winemaking industry that took off around two decades ago. Photo by Ipsita B/Flickr.

Manjunath, too, said his efforts at Grover are as much dedicated to the next yield as they are to the future, thereby adopting new viticultural practices such as dry farming techniques, trying out bush vines so that grapes are covered under canopies and are less exposed to the harsh sun, applying sub surface irrigation, where the water requirement is lesser, and pruning late in Grover's Karnataka vineyard and early in Nashik to cut the risk of rains. Besides experimenting with new varieties, he is also opting for drought-tolerant rootstock, measures that R.G. Somkuwar, the principal scientist (horticulture) of National Research Centre for Grapes, Pune, also concurs as crucial for adapting to long-term climatic changes.

The early development of sugars, leading to high alcohol content, may just be in advantage of Indian wine brands, points out Sharma, as "Indian wine drinking population prefers wine with high alcoholic content, unlike wine drinkers in Europe who are demanding wine with lower alcohol content. He also pointed out that the varied development of acidity in wines is often tackled by winemakers who are allowed to add acids to wine that lacks the same.

As sommelier Magandeep Singh, who is nothing but optimistic of the future of Indian wines, stated: "Since we don't have 1,000 years of history, we're not tied down to observing one thing as the law. And that's a great thing. Sometimes being young helps; you're nimble and more agile."

However, Sonal Holland, who holds the title of being India's only Master of Wine (a coveted qualification from the U.K.-based Institute of Masters of Wine), is skeptical at best about the future of wine industry in the country. She, too, thinks there will soon rise a "desperate need" to seek cooler regions than Nashik and experiment with heat-resistant grape varieties such as Grenache and Tempranillo, eliminating early ripening varieties like Pinot Noir and Riesling, which means more reds and less whites.



Sonal Holland, India's only Master of Wine, believes that there will soon rise a "desperate need" to seek cooler regions than Nashik and experiment with heat-resistant grape varieties, which means more red wines than white wines. [Photo from Max Pixel.](#)

Holland said that even if Nashik may be 700 metres above sea level and experience hot days and cool nights, it is, after all, a tropical region, and too close to the equator. "Today, vineyards of the world are moving away from the equator and towards the poles," she adds. "And I do not think Nashik being a few 100 metres above sea level is going to make it immune to climate change problems."

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Banner image: Grover's vineyard in Karnataka. Photo from Grover Zampa.

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