

Optimising Wine Quality by Zoning

Dan Bloomer and James Powrie, LandWISE

Villa Maria's harvest map for one vineyard has been so successful it's being used as a whole of season management map.

Their aim is higher quality wine from targeted inputs says Villa Maria manager, Phil Holden. He says they are very excited about the potential to optimise their production.

Villa Maria worked with Spatial Solutions to plan selective machine harvesting to enhance wine quality. They used a crop sensor and GPS to identify juice quality zones, and created a harvest map for one of their Hawke's Bay vineyards.

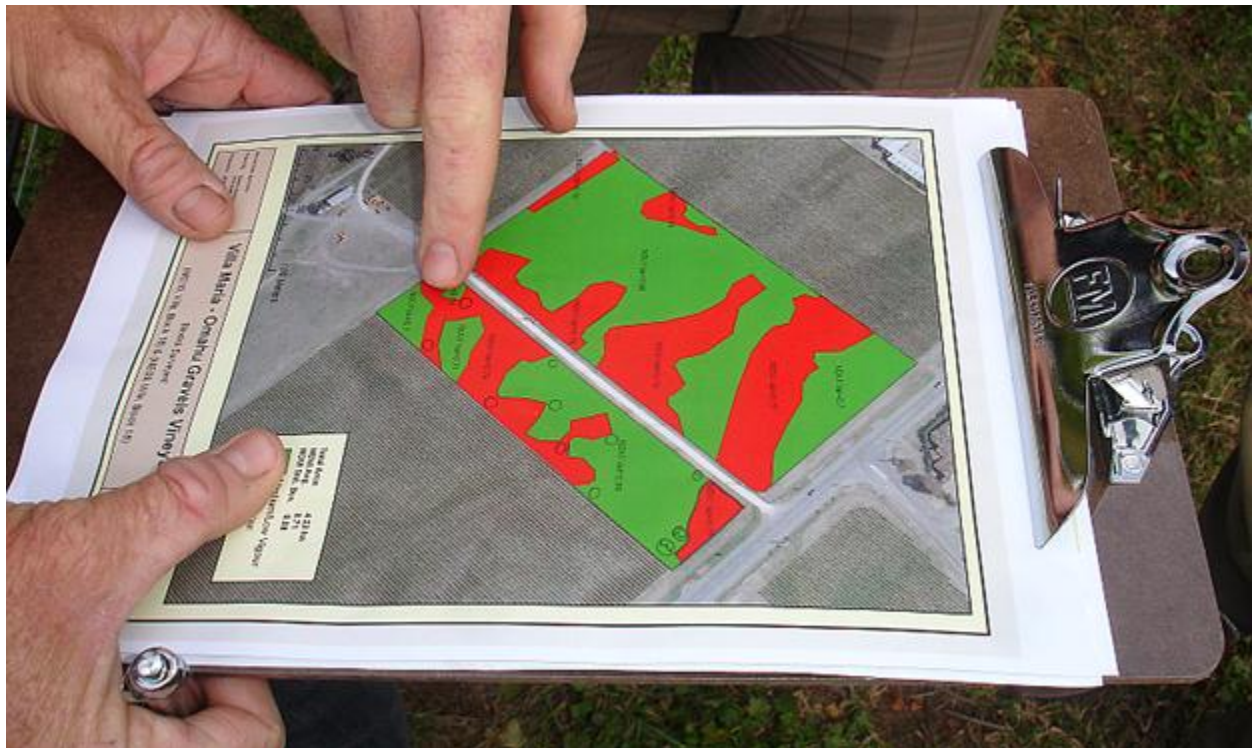
Phil says there can be extra costs - the harvest cost virtually doubles if you drive through twice and there are issues getting contract labour to treat vines differently along the row. But the quality advantage is there.

In practice, the process involved mapping the vineyard canopy with a Crop Circle ACS 470 sensor

mounted on a quad bike and linked to RTK-GPS Maps based on the normalised difference vegetation index (NDVI) identify high and low canopy vigour zones in the vineyard. These are used as a reference for canopy management planning, crop quality monitoring and determining harvest dates.

Following further field checks and discussions with viticulturists and wine makers, final harvest maps are prepared. This allows reserve-quality wine vines to be identified and selectively harvested. Sometimes remaining grapes are harvested for estate range wines. New machine harvesters may hold grapes in separate hoppers, allowing a one-pass harvest.

But given the right weather, the remaining grapes can be hung out a bit longer. They reach higher brix levels as they mature and may also reach premium quality levels.



NDVI map identifies quality zones in vineyards. Red areas reflect soil differences running across vineyard rows.



"We have to make operations sensible," Spatial Solutions' Hayden Lawrence says. "The harvester can't turn on or off for half a plant. We cluster areas together to make a map the driver can use. In the cab, they pretty much follow progress on a red or green map. This season the driver was the auto switch. Next season we'll have the harvester mechanism controlled by electronics, based on GPS location and the harvest map."

Company viticulturist Ollie Powrie says they are very excited about the potential to be more precise with harvest planning and the potential to make better wine. "Selectively harvesting the best separately lifts the overall value achieved in the vineyard. The proof, of course, will be in the tasting."

Initially focused on harvest planning, the identified zones are now being used to selectively manage all operations.

The vineyard's Gimblett Gravels soils vary east to west, conflicting with the ideal north to south vine

row set up. To manage the variation, different pruning, canopy management and fruit thinning practices are being applied.

Other ways to create management zone maps are being explored. High resolution satellite images have high potential, and Google Earth or local council photography provide a starting point.

The same NVDI sensing technology is being trialled in vegetable and arable crops. It is a potential aid to manage nutrition and assess biomass for spraying.



Simple ribbon markers identify red and green zone change points