

Multispectral Imaging for Split Picking

Literature within precision agriculture (see Bramley *et. al.*, 2003; Proffitt & Pearse, 2004) has suggested that precision viticulture, and specifically split picking is a key technique by which small, medium and large vineyards of varying technological advancement can increase their growing profits in the coming years.

How does it work?

There are four stages of the split picking process.

Along with our partner companies, Hamilton Viticulture and Advanced Technology Viticulture (ATV), we can guide you through this process, providing an end-to-end consultancy service, as well as issuing the necessary hardware and software.



1. Data Collection / PCD Mapping

In this primary stage of the process, you do not need to do anything. We fly over your vineyard, and capture multispectral imagery. From this, we provide a **PCD map**, which shows the varying vigour of vines across the block.

Case Study – Padthaway Shiraz 2004 (Bramley & Hamilton 2004) (right).

Using the method above, this block was split into two sections: '1', a high yielding hollow, 1.8m deep '2', the remainder of the block. '3', is a hypothetical harvest of the whole block as one unit.

This \$4,657 benefit in grape value translated to a benefit of \$272,971 in wine value, as grapes were used for \$14 and \$24.50 bottles, rather than the \$18 bottles they would have gone into.

Case Study – Margaret River Cabernet Sauvignon 2002

PCD Mapping was again used to create a harvest map. The more vigorous zone this time was harvested 9 days later, and the fruit was of sufficient quality for \$22.50 per bottle.

Block	Area (Ha)	Yield (Tonnes / Ha)	Tonnes	Price per bottle	Wine value	Return per tonne*
Zone 1	3.5	4.6	16.1	\$30	\$418,599	\$25,999
Zone 2	4.6	7.3	33.6	\$19	\$552,951	\$16,466
Total					\$975,618	\$19,638
Single pick	8.1	6.1	49.5	\$19	\$813,618	\$16,467
*Assuming extraction of 650 litres per tonne, 750 ml bottles				Benefit	\$154,077	\$3,171
Margaret River Cabernet Sauvignon 2002						

2. Ground calibration / harvest mapping.

The PCD map provides you with a good indicator of the areas in which there are different qualities of grapes, but will not tell you what these different qualities are. Using our advanced data delivery, you can load the PCD map on a **mobile device** GPS platform, and walk to a number of test sites. This allows correlation to condition on the ground. When you have decided how the PCD map correlates to grape condition (yourself or with assistance from **Hamilton Vit.**), you can create a **harvest map** (left).

3. Harvest

For harvest, our partners at **ATV** provide state of the art split picking hardware. When you have your harvest map, this is loaded onto the ATV system, which sits in the harvester, and alerts the driver when there is a need to switch the bins the grapes are harvested into. For hand picking, you can again load the harvest map onto a mobile device, and go out and mark the areas of differing quality.

4. Sale / Production

The benefits of split picking can be huge, both for grape growers and winemakers. Having separated the differing qualities of grapes, you should be able to command a higher price than a uniform harvest.

Zone	Area (Ha)	Yield (T/Ha)	Grade	Price/Tonne	Value of grape production
1	0.83	25.0	C	\$1200	\$24,900
2	3.42	17.1	B1	\$2100	\$122,812
Total					\$147,712
3	4.25	18.7	B2	\$1800	\$143,055
Split Harvesting Benefit					\$4,657 (+3.25%)
Padthaway Shiraz 2004 (Bramley & Hamilton, 2004)					

Whilst split picking cannot guarantee a successful vineyard, data suggests that in most cases, split picking should generate large profits – between \$3,000 and \$10,000 advantage over uniform picking per 10 Ha block, after additional costs considered. With our prices starting from only \$30 per hectare for mapping, it's worth a try!