



NEW ZEALAND WINE
PURE DISCOVERY

Water Management in the Wine Sector

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New Zealand Winegrowers

Vineyards in New Zealand

- **36,192 Ha (28,231 white, 7960 red)**
 - Sauvignon blanc 21016 Ha (58%)**
- **Average vineyard size 17.4 Ha**
- **Most planted on ancient riverbeds with well drained soils**
- **Almost all are irrigated (86%)**
- **Average irrigation of 160 mm (660 L/vine) in 2014/15**

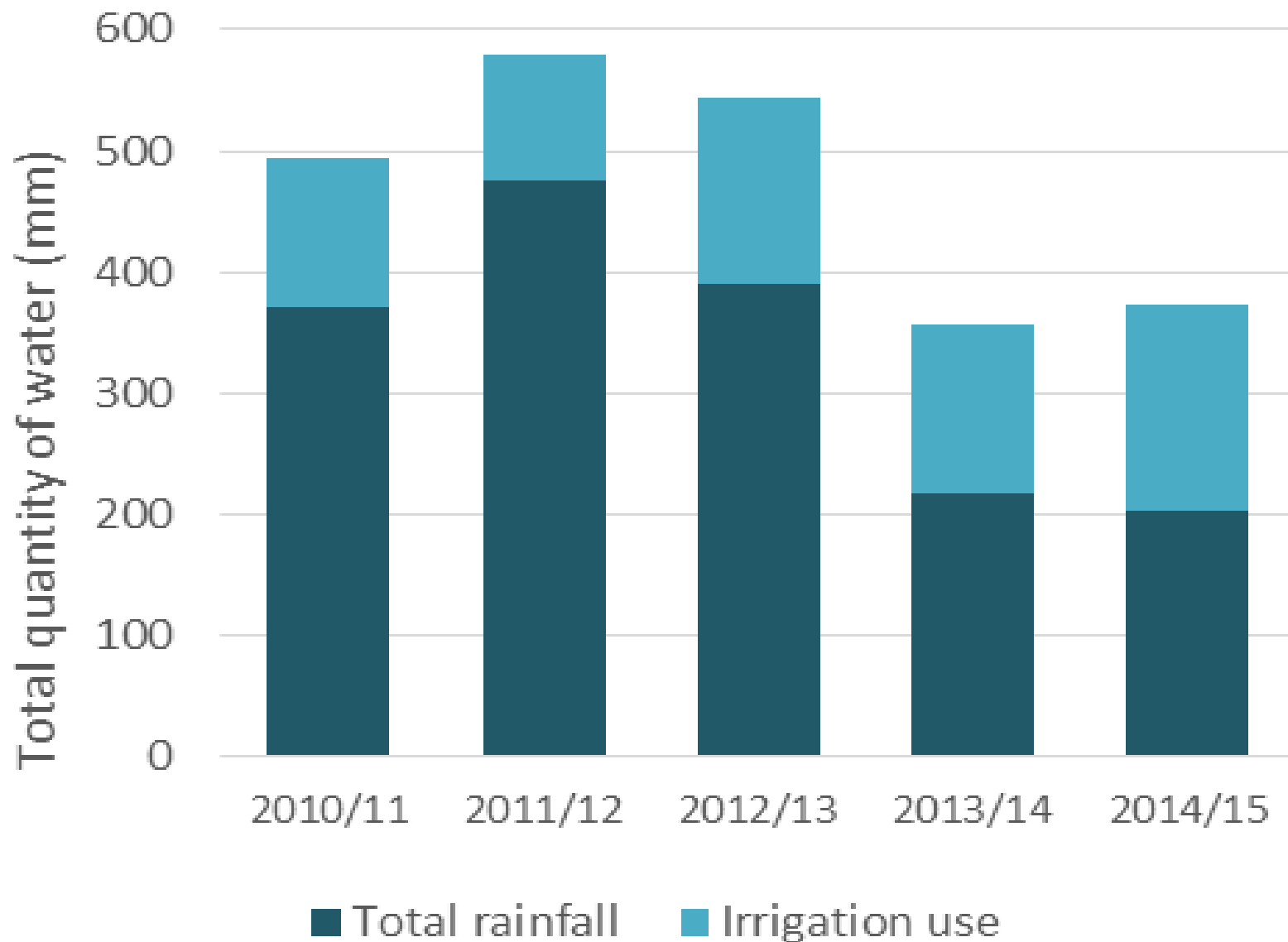


Vineyard Water Use

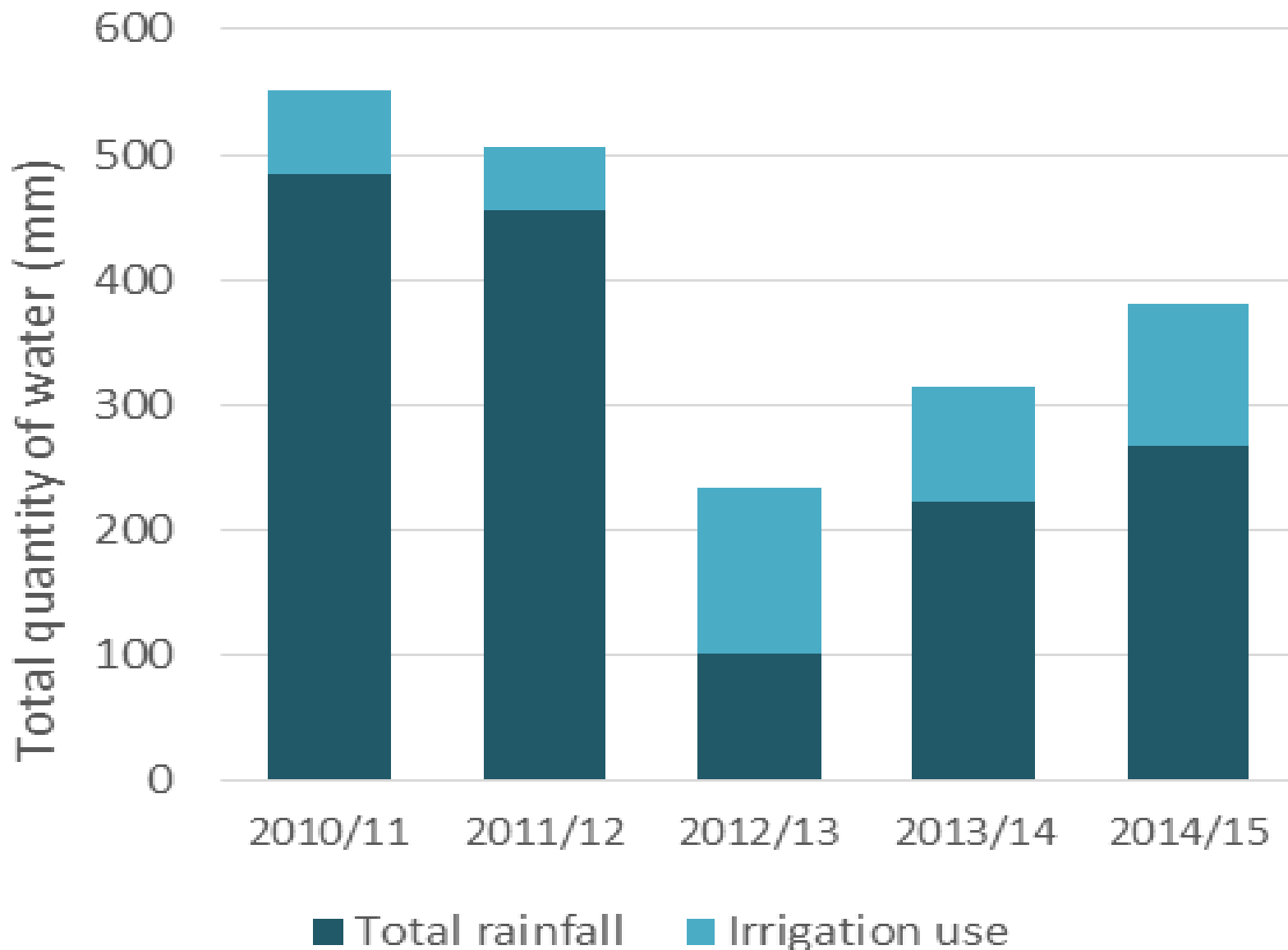
- **Water generally drawn directly from bores or rivers**
- **Some vineyards use water for frost protection, though windmills are more common**
- **Drip irrigation the standard due to its efficiency**
- **Soil moisture monitoring reasonably common**



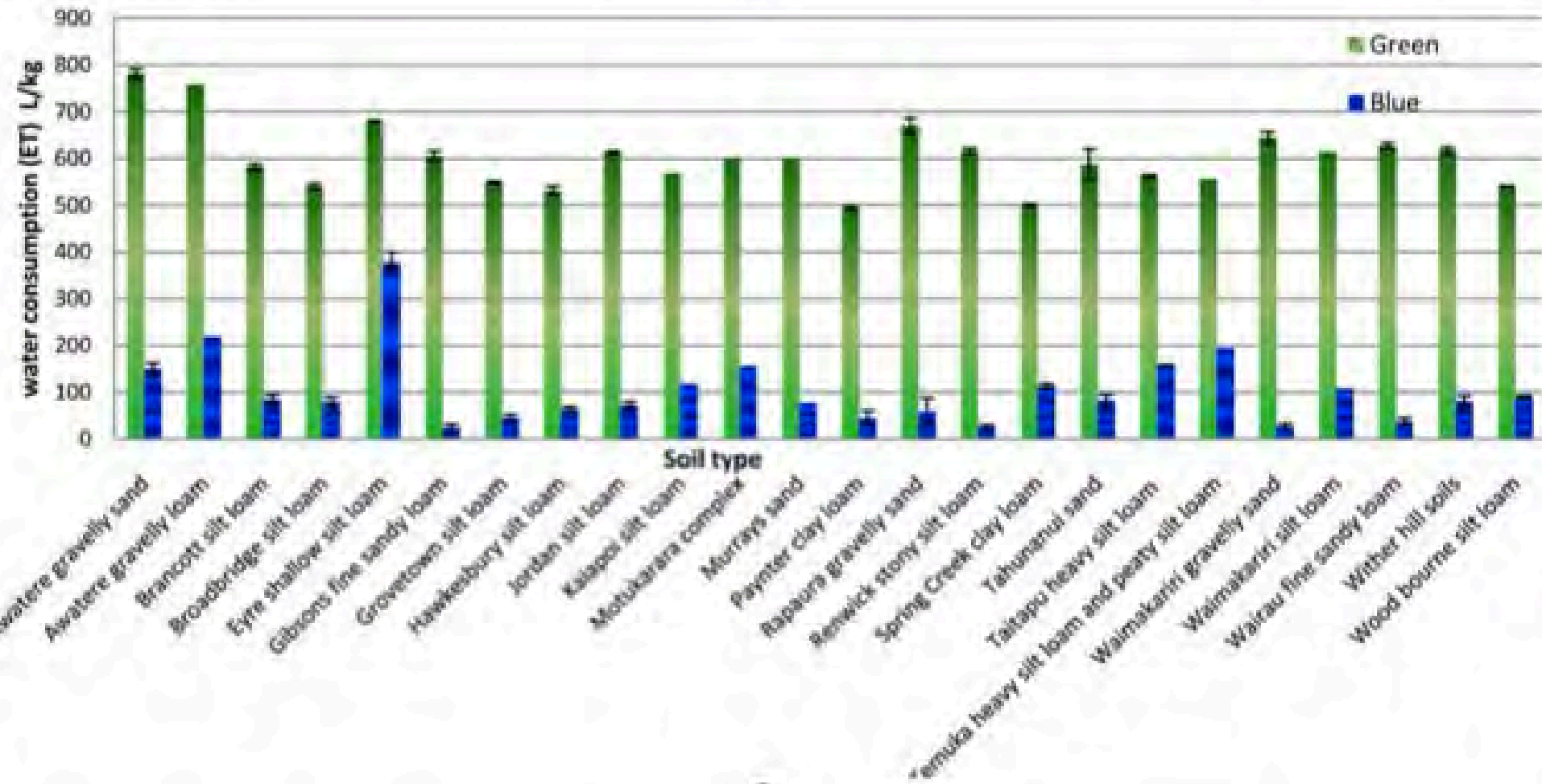
Marlborough water use (Oct-Apr)



Hawke's Bay water use (Oct-Apr)

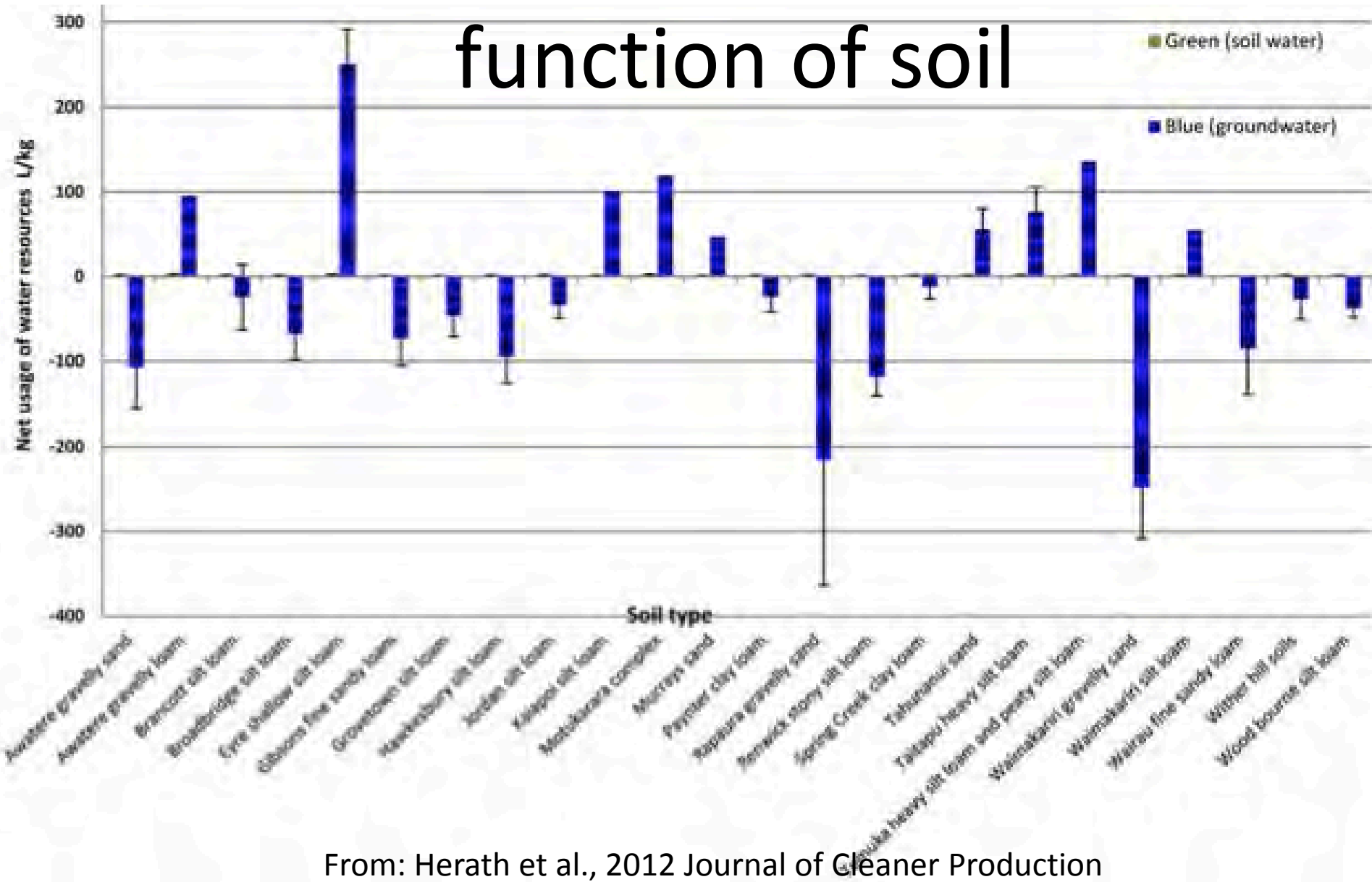


Water usage as a function of soil



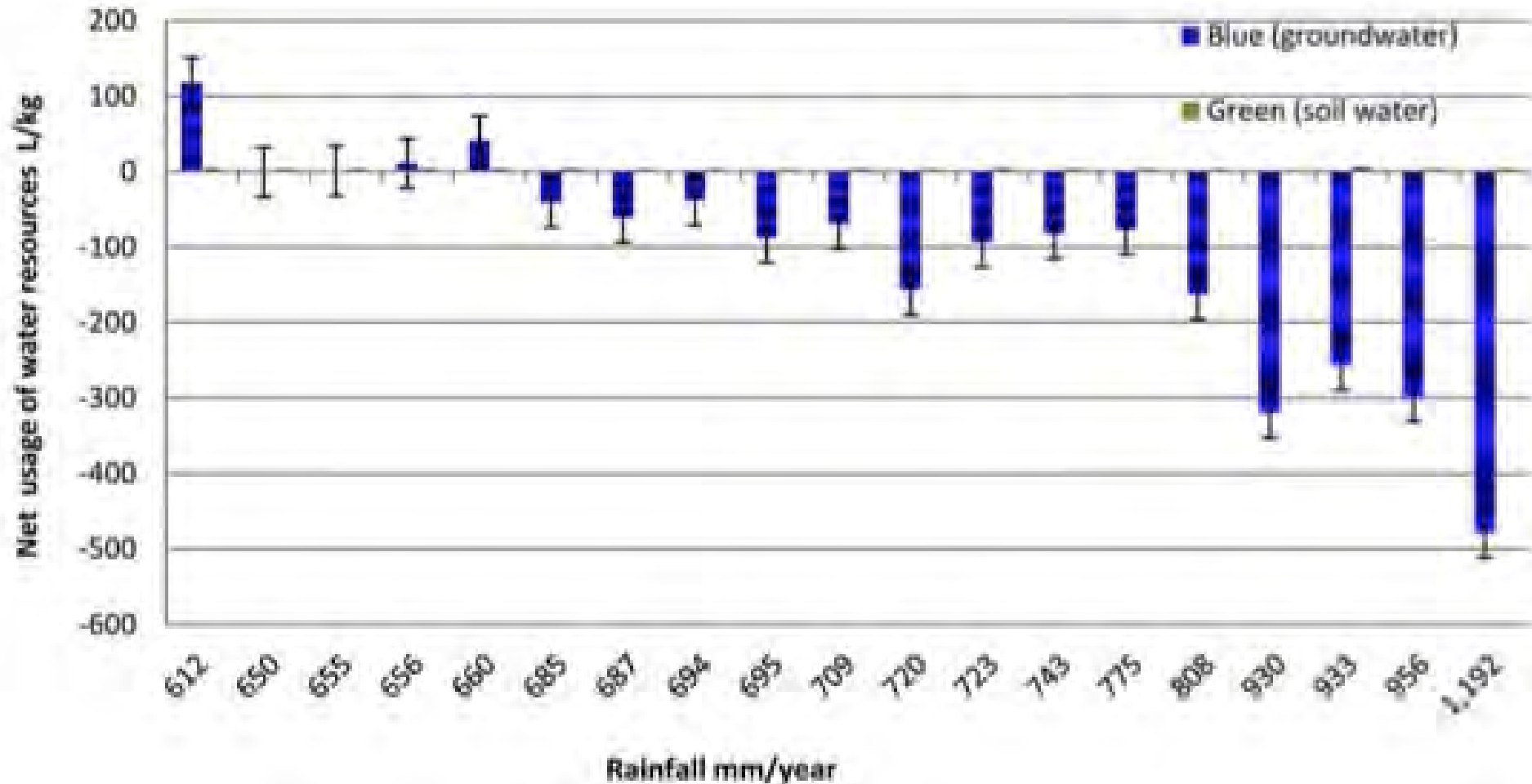
From: Herath et al., 2012 Journal of Cleaner Production

Net groundwater usage as a function of soil



From: Herath et al., 2012 Journal of Cleaner Production

Net water usage as a function of annual rainfall



From: Herath et al., 2012 Journal of Cleaner Production

Winery Water Use

- **Primarily for cleaning of tanks and other equipment**
- **Estimated as 3-4 litres water per bottle of wine**
- **Winery wastewater must be treated**



Timing of Vineyard Water Use

- **Frost protection takes water in spring and, rarely, in autumn**
- **Higher irrigation rate early season in the season (December-February), tapering off after that point until harvest in March/April**



Water Restrictions

In recent seasons, fruit and grape growers have been cut off from water suddenly with disastrous results

- **More attention to early season water and smaller canopies**
- **Seeing how little water is needed to ripen a crop**
- **Water storage dams**



A New Paradigm

Recently, many grape growers are interested in looking into where water savings can be made in the vineyard.

It is becoming clear that overuse of water is actually costing growers more and reducing quality. This is especially true for grapes for red wine.



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Benefits of reducing irrigation

- Reduced canopy growth
- Yield control
- Smaller berries
- Higher levels of phenolics
- Faster ripening
- Better flavour development
- Reduced fungal disease
- Less weed growth



Case Study

A Trial was set up in a Villa Maria Merlot vineyard in the Gimblett Gravels to look at the effect of reducing irrigation in red winegrapes





Trial was to develop an irrigation strategy that would:

1. Be easy to implement



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Trial was to develop an irrigation strategy that would:

1. Be easy to implement
2. Save water



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Trial was to develop an irrigation strategy that would:

1. Be easy to implement
2. Save water
3. Reduce yield to target



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Trial was to develop an irrigation strategy that would:

1. Be easy to implement
2. Save water
3. Reduce yield to target
4. Reduce farming costs



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Trial was to develop an irrigation strategy that would:

1. Be easy to implement
2. Save water
3. Reduce yield to target
4. Reduce farming costs
5. Increase quality



Vineyard trial design

Begun early January (pea size +)

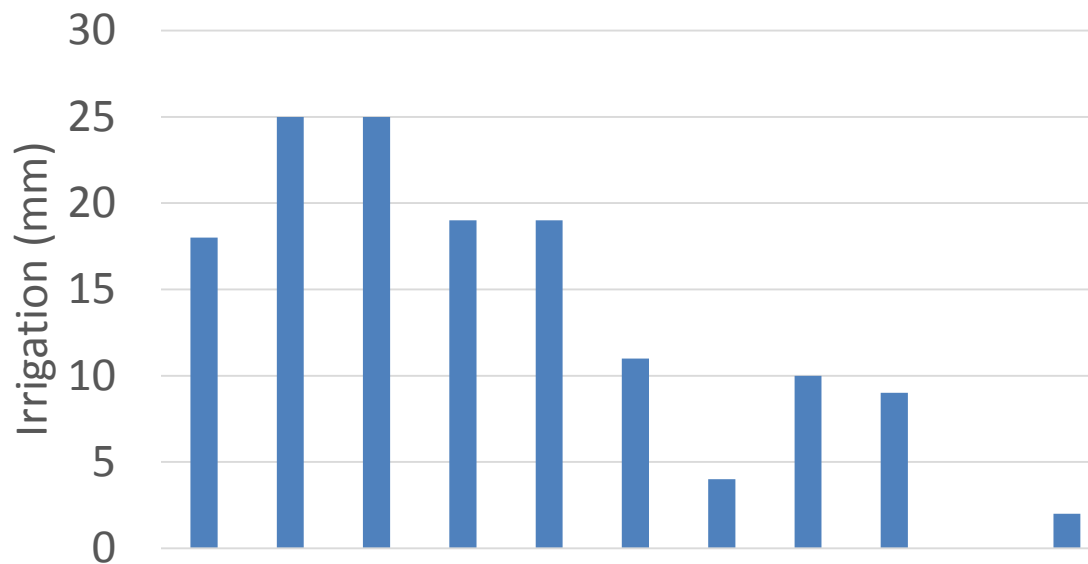
Vineyard divided in half

-Half irrigated traditionally (2-3 times per week, 2 hours)

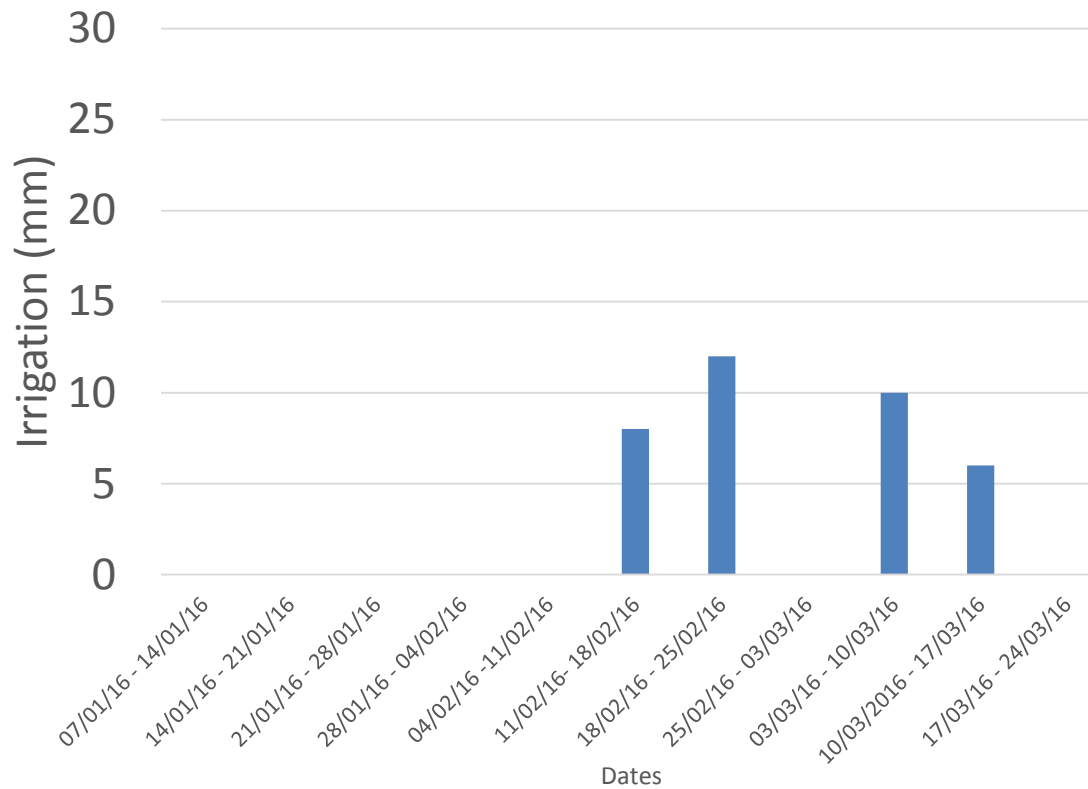
-Half irrigated when SWP reached -1.2 MPa, but for 6-8 hours



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**Standard
Irrigation**



**Deficit
Irrigation**

Water savings

Total irrigation water applied

Control = 142 mm/vine

Deficit = 36 mm/vine

Difference = 108 mm/vine (427.7 L/vine)

427.7 L/vine X 2778 vines/Ha =



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1,188,095 L/Ha!!!



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Vineyard Results

Reducing irrigation meant one fewer pass needed for:

- Crop thinning (none needed)
- Weed spraying
- Leaf plucking
- Trimming
- Hedging



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Wine Results

- The reduced irrigation wine had more colour, riper flavours, and smoother tannins
- The wine made from reduced irrigation was preferred by most who tasted the wines





Benefits to reducing irrigation

- Increased wine quality in red wines
- Decreased farming costs
- Less chemicals needed for fungus and weed control
- More water left in aquifers and rivers
- Reduced water footprint

Future Work

- Investigating the effects of reducing irrigation in other red grape varieties
- Trialing growing white grapes with less water input by monitoring vine water needs
- Looking into the possibility of dry farming grapes



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...and you



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