

Biophysical environment:

New Zealand's winery Estate, Winery and Vineyard is in the Awatere Valley, Marlborough. In an area near Seddon, called Seaview, the winery Estate is located on the east coast with vines covering 1000 hectares spanning inland. Marlborough is well known for its ideal grape growing climate, with Seaview as the southern most of the three-main viticulture based sub- regions of which Seaview has the coolest temperatures and least annual rainfall. Strong offshore winds give the area an edge when it comes to winter weather, as due to the proximity to the coast line winds help to prevent frosts.

1

The soils of the Seaview are made up of Silty Loam which is a mixture of sand, silt and clay. A loam is named after the type of soil the dominates it, in this case the soil is mainly silt, thus silt loam. Silt loams are common in New Zealand, especially common in soils that are deposited by rivers, e.g. in flood or former river valley.

The soil in the Seaview area is classed as 'imperfectly drained' which means that it drains well naturally, but often not ideally. The soil structure and integrity have a moderate level of erodibility and a high structural vulnerability (67%). This means that in the event of increased rainfall or extended use of heavy equipment the soil is more likely to erode. The soils likeliness of becoming water logged is very high however its drought vulnerability (if not irrigated) is moderate, so water retention is in some ways a positive thing.

2

All of the physical properties listed above will have been taken into consideration when it came to develop the land for agricultural use (agricultural because formally the Seaview property was a 5-6 sheep farms). During developing of the agricultural setting, the land would have been altered to allow for farm roads and paths.. When it comes to viticultural use, the land was altered to lay drains and allow for waste disposal from the winery. Naturally occurring swamps or marshes also may have been filled in or drained away to allow for more effective land use.

3

4

5

The majority of the water that is onsite is pumped from the Awatere River and is held in many man made storage ponds and wet lands. The vineyard has A, B & C water rights to the water in the Awatere River and are able to pump water from it until the water levels of the Awatere River reach low levels.

Annual rainfall is also another factor that influences the rate at which water is pumped from the Awatere River. Seddon's average annual rainfall is just 625mls, considerably lower than the likes of the Wairau area, another of Marlborough's grape growing sub-region where the average annual rain fall is 724mls. As each plant needs an average of 4-8L of water per day, irrigation is needed to upkeep such quantities. As 4-8L per plant per day is needed for growth and survival of the vines, a lot of water is needed in total. 8000 plants are in each hectare of grapes and having 988 hectares of planted onsite. Water storage is key as on average the wettest month of the is July and still only 68mls of rainfall is averaging. The drier months are even harsher, February averaging just 30mls.

6

Ultimately, the growth of a monoculture isn't sustainable unless steps have been taken to mitigate and control damages done to the environment. The actions that are taken to have the successful vinery, on their own have a negative effect on

the environment. As the environment is not naturally covered in rows upon rows of grapes, work has been done for the vineyard to be operable, including, levelling land, erecting tanalised posts, removal of trees, shrubs and other plantations and rocky outcrops, the laying of drainage systems, irrigation pumps and roads wide enough and heavy wearing enough to carry heavy machinery to follow. All these things take away the diversity of the physical environment and the naturally established biodiversity of the ecological environment.

The main contributing factor to loss of biodiversity is having only one species growing in one place, labelled as a monoculture. *Vitis vinifera* (the monoculture) is the variety of grapes grown at the vineyard, it is a common grape variety. The definition of a monoculture is: an agricultural setting in which is practiced, the generally wide scale, production of a single crop or plant species, in one place at time. As the growing of grapes is in a monoculture, there is a loss of biodiversity that is involved in making the environment suitable for such practices.

7

Actions have been put to work to help not only reduce the waste of the vineyard but also lessen the environmental impact of the monoculture and help to counteract and bring balance back to the ecosystem. The owner of the winery is an innovative man with equally innovative ideas, some of which include:

Solar panels; At the start of 2013 one of the country's largest installations of Solar Panels were installed. Generating 15% of the company's own power, impressive for a business of its size. The use of solar panels is a sustainable action, even more so on a scale as large as this. Solar is a renewable way to generate electricity as it doesn't require the burning of fossil fuels, which not only are a finite resource but in burning fossil fuels CO₂ is released into the atmosphere adding to carbon emissions.

8

Wetlands: The making of over 25 wetlands, to help introduce more variety in species that can live in the primarily monoculture. Plantings that have taken place in these wetlands attract native nectar feeding birds such as Tui and Bellbird and allow a safe place for them to thrive. These plantings on the banks of the waterways are also effective in minimising erosion and stop the surface soil run off. These wetlands double also double as water storage, that would be used for irrigation when it comes to extreme drought conditions.

9

Babydoll Sheep: Although any sign of these special sheep was absent during the duration of our visit out to the vineyard. Their purpose is to save machinery being driven between the rows on a regular basis to trim the grass. These sheep graze in between the row, and due to their short height, can reach the grapes themselves of the greenery on the vines. This saves on fuel and the carbon emissions that would be released if the fuel were to be used.

10

I came to the conclusion that the wetlands are the most effective measure because that is where we saw the most different species of birds and insects all day.

11