CROMWELL COLLEGE – GEOGRAPHY

ACHIEVEMENT STANDARDS 91009 AND 90160

RESOURCES

Name .....

Central Otago

Wine Map

A Guide To Wineries & Vineyards New Zealand

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Task 1a - Resource

Wineries in the South

A Guide to Central Otago Wineries and Vineyards

Although small, Central Otago is a rapidly developing wine growing region, with over 178 vineyards, and an international reputation for Pinot Noir. In 2007 Pinot Noir comprised approximately 85% of the total vineyard plantings, with Chardonnay, Pinot Gris and Riesling accounting for about 8% each. Other minor varieties to perform well on suitable sites are Sauvignon Blanc and Gewürztraminer. Production of sparkling wine, traditionally made from Pinot Noir and Chardonnay grapes, has been small but the high quality achieved has seen the wines well received.
"This is God's Country when it comes to Pinot Noir" (James Halliday in Panorama 2000)

Location

At 45° south this is the world's southernmost winemaking region. The region is mountainous, rising to over 2000m with the vines planted amongst spectacular alpine scenery. The vineyards are also the highest in the country, located between 200 and 450 metres above sea level.

History

Central Otago has a rich historical heritage. John Desire Feraud was attracted to the area during the Dunstan goldrush of 1862. Feraud came from a French winemaking family and quickly recognised the potential for grape growing, planting the first wine grapes in Central Otago in 1864. Over the next 20 years he made a variety of wines, some winning prizes in Sydney wine competitions. His stone built winery "Monte Christo" survives today and two of Feraud's transluscent deep-blue bottles may be seen in the Clyde Museum. Following his departure from the region, commercial winemaking ceased and was not revived until the early 1980's with experimental grape plantings around Queenstown, Wanaka and Alexandra. The first modern commercial wines were produced in 1987. The annual Feraud Dinner, hosted by the Central Otago wine industry, celebrates his pioneering vision and enterprise.

The Sub Regions

Central Otago is comprised of four distinctive sub-regions separated by mountains and deep gorges. The Cromwell basin accounts for 70% of the regions' vineyards and includes Bannockburn in the south, Lowburn, Wanaka Road and Bendigo to the north. A further 20% of plantings are found around Gibbston where most vines occupy steep north-facing fans and terraces above the dramatic Kawarau Gorge. In the southwest of the region are Clyde and Alexandra (7%), with vines nestled among rugged schist tors in a dry intermontane basin. The remainder of the vines (3%) are located around Wanaka where vineyards run down to the shore of the lake against a backdrop of snow-clad mountains and glaciers.

The Soils

Central Otago's vineyards are located on a variety of soils ranging from windblown sands to heavy silt looms and weathered schist. Most of the soils are derived from loess or alluvial deposits, often with underlying gravels allowing free drainage. To the west some of the soils are developed on glacial outwash or moraine and there are even small pockets of man-made soils resulting from hydraulic sluicing during the gold mining days of 140 years ago. Each of these soil types has a distinct influence on the growth and flavours in the grapes.

Climate

Central Otago is the only area in New Zealand with a semi-continental climate resulting in greater daily and seasonal extremes of temperature than found elsewhere in the country. Summers are hot and dry, with autumns cool and generally dry with cold nights. Rain falls evenly throughout the year and averages from 325-700mm per annum, generally increasing to the west. The relatively low rainfall results in a low incidence of botrytis and other fungal disease reducing the need for spraying. The large diurnal temperature variation – the difference between daytime and night-time temperatures – contributes to flavour intensity, gives depth of colour and stability to the wines.

Heavy frosts are common throughout the winter and frost can occur at any time between March and November. Vines are susceptible to frost in the growing season and as a result most vineyards are on warm north-facing slopes which promote cold-air drainage. On flatter sites wind machines, water sprinklers and misting systems or other frost protection measures are adopted.

Task 1a – A description of viticulture in the Cromwell Area

Use **Task 1a Resource** to answer these questions. The information you prepare will be used to write a description of viticulture in the Cromwell area in your assessment. Write your answers under the questions.

1) The Cromwell area is part of which larger wine growing region?

2) What % of the regions vineyards does the Cromwell area account for?

3) What 4 other smaller areas make up the Cromwell area?

-
-
-
-

4) What is the main type of wine produced in this area?

5) In 2007, what % of total vineyard plantings did this variety account for?

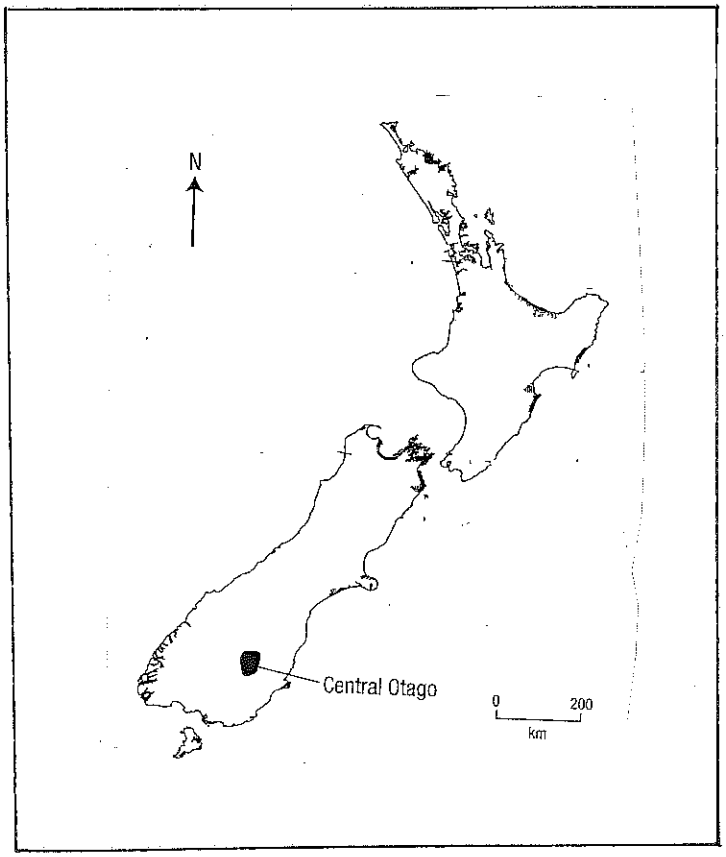
6) What 3 other variety of grapes make up 8% each of the total vineyard area?

7) On the sheet : **Central Otago Wine Map**, highlight all the vineyards that belong to the Cromwell Basin, Bannockburn and Cromwell areas – How many vineyards are there in the Cromwell area in total?

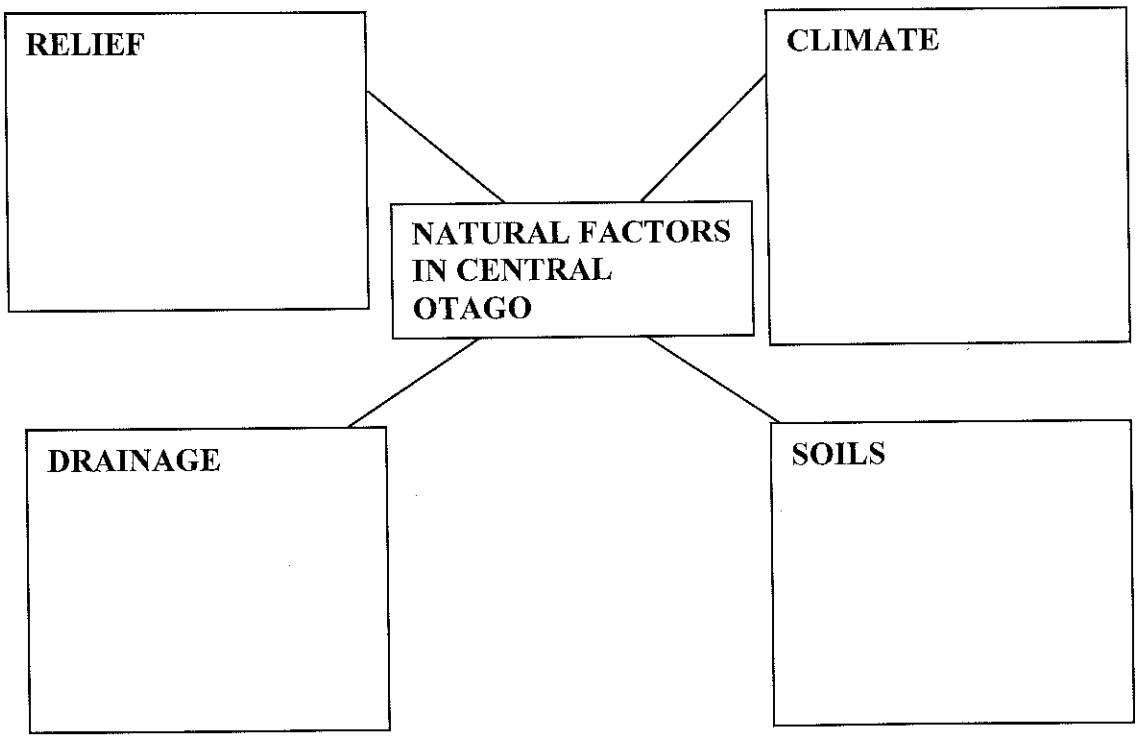
TASK 1a - RESOURCE B

RESOURCE USE IN A FARMING CONTEXT – VITICULTURE IN CENTRAL OTAGO

- Viticulture is a branch of Horticulture and is the growing of grapes as a cash crop using range of renewable resources in the operation of the farm eg sunshine, rainfall, vines and the farmers knowledge.
- Viticulture in Central Otago is part of a rapidly expanding New Zealand wine producing business
- There are a number of natural and cultural factors which allow viticulture to take place in Central Otago and the Cromwell Basin:

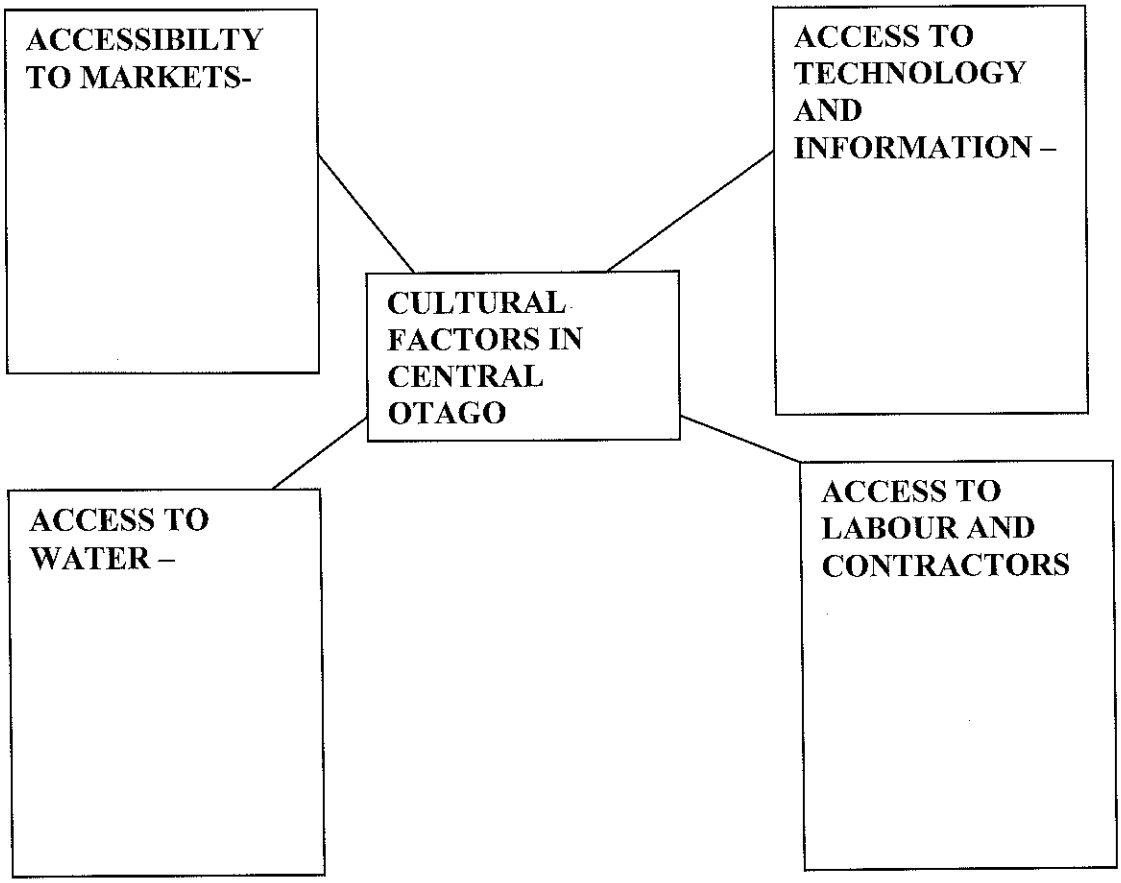


NATURAL REASONS FOR DISTRIBUTION



- vineyards such as Akaroa located on sunny, free draining hillsides in Bannockburn
- 2000+ hours of sunshine.
- Water available from Clutha and Kawarau Rivers.
- Extremes of temps – winter down to -10/20◦C, summer up to 30/40◦C
- soil is dry and well drained
- Schist and loam soils free draining

CULTURAL REASONS FOR DISTRIBUTION



- Irrigation systems are well established in the area
- History of casual labour, many returning migrant workers at harvest from Vanuatu
- Many specialised contractors eg Vinpro
- Otago Poly course based in Cromwell. Established area with depth of experience available.
- Transport links SH1 and Queeenstown airports ,
- Most vineyards have cellar door sales.

Task 2a) Fully explain the consequences on the environment of viticulture in the Cromwell Area

Viticulture is a significant resource use in the Cromwell Basin environment. This has impacts on both people and places. These impacts can be both positive and negative.

As an agricultural land use, viticulture is bound to create impacts on the environment, particularly from conventional vineyards. Look at the table below and see if you can match up the environmental impacts with their descriptions. Use the information in this table to complete task 2a below

Impact / consequence	**Description**
Water pollution	Growing the same crops for too long without a break can lower soil fertility
Excessive water use	Created by some bird scarring methods e.g. guns, screechers
Air pollution	Cultivating crops with bare soil between rows can lead to soil erosion by weathering
Soil exhaustion	Irrigation can deplete ground water supplies
Soil erosion	Tanalised wood used for vine posts. Over time, the chemicals from the wood seep into the soil
Soil compaction	Run –off from fertilisers gets into waterways and alters nutrient levels which can lead to algae build up
Noise pollution	Spray drift can occur when chemicals used on the crops can be spread by the wind
Toxins from vine posts	Due to the weight of heavy machinery and vehicles
Monoculture	Spraying artificial fertilisers directly onto the vines does not improve the fertility of the soil
Use of chemicals	Planting only one crop makes the area vulnerable to pests and diseases which increases the reliance on pesticides and herbicides Organic vineyards such as Aurum recycle water and keep all the water they use on the vineyard and filter and clean it. Wetlands have been created for native birds and frogs
Water management	Planting only one crop makes the area vulnerable to pests and diseases which increases the reliance on pesticides and herbicides

The table above gives examples of negative impacts of viticulture on the environment from conventional viticulture. Organic viticulture has less environmental impacts as it focuses on using

organic fertilisers and natural pest control methods such as ensuring biodiversity and not using chemicals as pesticides etc. However, both types of viticulture do change the land use in an area and

people's perception of this land use varies. Some people perceive that any changes to the natural environment are negative. Others perceive that a positive impact of viticulture is that it is a productive use of land that is not much good for anything else (marginal land) .

Assessment Task 2a

The consequences of viticulture on the Cromwell area natural environment.

On a separate piece of paper, write 3 paragraphs explaining the consequences of viticulture on the Cromwell area environment under the following headings:

1) Consequences on soil

2) Consequences on air quality

3) Consequences on water

Consider both positive and negative impacts . Make sure that you included some Geographic concepts such as CHANGE and PERCEPTION

Task 2b) Fully explain the consequences on people of viticulture in the Cromwell Area

Complete this activity sheet as preparation for your assessment

The consequences of viticulture on people in the Cromwell area can be divided into :

SOCIAL **CULTURAL** **ECONOMIC**

Social Impacts – this refers to how people's day to day lives are affected. There are some links here with both cultural and economic impacts. Obviously, if you have a job and money coming into your family, you have a better lifestyle etc which impacts upon you socially. Social impacts also include health and well being.

Economic impacts – These refer to things like employment, business etc. Remember that people do not have to be directly employed by the viticulture industry to be impacted by it

Cultural impacts – These refer to how we interact with others. Do we connect with other cultures and how does this impact upon us

Any impacts/consequences may be both positive (good) and/or negative (bad)

Complete the table on the next page with any ideas that you may have on the impacts of viticulture on people. Try to come up with both positive and negative examples:

The consequences of viticulture on people in the Cromwell Area

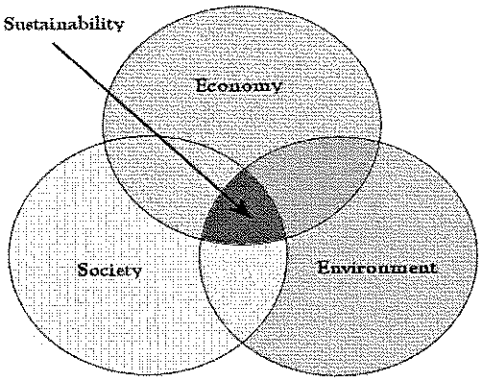
Complete this table and use as a basis for Task 2b in your assessment

Social Impacts	**Economic impacts**	**Cultural impacts**
Positive:		
Negative:		

Task 3 – Resources

The sustainability of viticulture in the Cromwell Area

- **Sustainability can be defined as:**
    - adopting ways of thinking or behaviour that allows individuals or groups and societies to meet their needs without preventing future generations from meeting theirs.



- For NZ vineyards, maintaining a balance between looking after the environment and people whilst producing an economically viable product is key to sustainability.
- Since 2010 all NZ vineyards have to be accredited as sustainable to be part of the group SWNZ (Sustainable winegrowing NZ) in order to export their wine which is crucial for economic sustainability.
- SWNZ concentrates on certain aspects which include soil, air and water quality, use of chemicals and energy and people.
- Being sustainable does not necessarily mean being organic but many of the vineyards in Central Otago are organic or biodynamic – 15- 17% of NZ's organic vineyards are in Central Otago. Of the 6 biodynamic vineyards in NZ, 2 are in CO
- CO has the largest amount of certified organic vineyards and all the other vineyards are a part of SWNZ
- A part of this means that the vineyards are monitored in their water, air and soil quality and strict controls are placed on the use of chemicals

Resource 1 : What is the industry view ?

OVERVIEW

The New Zealand wine industry has a strong commitment to sustainable production in both vineyards and wineries, and sustainability forms a significant part of New Zealand's message in the market at both industry-wide and individual business levels.

New Zealand is a truly new world country, being amongst the last in the world to be discovered, it has a relatively small population and a predominantly unpolluted environment. As a country New Zealand has a high level of commitment to sustainable production, as is evidenced by the fact that the greatest proportion of our electricity is produced from renewable resources.

In the early 1990's wine industry leaders recognised that the natural resources of the country, and the industry, were of significant value and needed to be protected and where possible enhanced. The industry was undergoing rapid vineyard expansion and this growth was projected to continue for some time. Along with this expansion there was new pressure on land and water resources, accompanied with issues related to changing use of land. In many cases not only was the use of land for viticulture new, but the land managers were also new to the production of grapes and wine. It was felt that developing guidelines for sustainable viticulture would help establish and retain good practice, and would also provide a valuable education tool by which results from industry research could be transferred to producers.

The growth of the industry was primarily driven by significant increases in exports particularly to the United Kingdom, which was showing a developing interest in purchase of goods with well established environmental credentials. Industry leaders felt that taking a proactive approach towards sustainable production would meet this growing demand and assist individual companies to enhance their marketing opportunities.

In the mid -1990's after considerable testing the industry launched a holistic vineyard programme, which has since become known as Sustainable Winegrowing New Zealand (SWNZ). In 2002, a new module was launched to provide guidance on sustainable management of wineries.

Following wide industry consultation, in 2007 New Zealand Winegrowers (the industry body) announced a bold Sustainability Policy aimed at having all New Zealand wines being produced under independently audited environmental programmes by 2012. The Policy was intended in part to promote participation in SWNZ, but also recognised other environmental-based programmes including ISO 14001, certified organic and biodynamic production. To support voluntary adoption of this Policy, New Zealand Winegrowers has made compliance a prerequisite for participation in events they organise.

Since the Policy was announced there has been significant increase in participation in both SWNZ and organic programmes albeit starting from a smaller base. It is estimated that over 94% of the producing vineyard area is participating in SWNZ, and a further 3-5% is producing under certified organic programmes. Participation in organic production is anticipated to continue to increase over the next decade in all likelihood reaching 20% by 2020. Although it was developed more recently, the SWNZ

winery programme has been adopted relatively quickly approximately 90% of the winery productive capacity is included in the programme.

Resource 2 :

Watch the following video clips on Google classroom

1) New Zealand wine sustainability

2) Why is sustainability important – New Zealand wine.

Questions :

Using the resources above, answer the following questions that will help you with the assessment task.

1) What is meant by the term 'sustainability' ?

2) Does the New Zealand wine industry believe that sustainability is important?

3) In what year did the industry begin to realise that New Zealand's resources needed protecting as development increased?

4) Why was the market of the United Kingdom important in helping the industry to realise the importance of sustainable production?

5) Which group was formed in the mid 1990s?

6) What % of wine producing area is part of SWNZ?

7) From the article above and the video clips that you have watched, do you think that the wine industry in NZ has a commitment towards sustainability. Give at least one example of why you think this.

Resource 3 : Sustainable practices on the Cromwell Area vineyards

1) Read your notes from AS 90160 on management practices

2) Read "What is meant by sustainability' Powerpoint on Google classroom

3) Watch the films clips on Google classroom on managing water use and soil

4) Read the Case study of Quartz Reef Vineyard – Bendigo, Cromwell

- The Quartz Reef vineyard in Bendigo is an award winning biodynamic vineyard which was established in 1996 by Rudi Bauer whose philosophy is that he sees himself on a the beginning of a journey for others to follow.
- The principles behind a biodynamic vineyard is that there is a balance between the vines and the environment and the people on the vineyard.
- The area naturally has quite poor soils and the vineyard concentrates on improving the natural fertility of the soil by using composts which are made on the vineyard by using cow manure, straw and left overs after harvesting. The compost is made at the Oct equinox and buried to mature until the April equinox. Organic and biodynamic farming concentrates on putting nutrients back into the soil.
- Following natural cycles of the moon is important in biodynamic viticulture and compost is sprayed on a descending moon.
- Water use is important and Rudi belives that by improving the fertility of the soil, water use is reduced as organic soils can hold the water better.

- The philosophy is to feed the environment not the plant.
- Pest control included planting cover crops such as alyssum and buckwheat that attracts insects. These insects naturally prey on others that could threaten the vines.
- By keeping the vines strong through using naturally occurring sulphur in stinging nettle teas, they are healthy to fight off diseases.
- To prevent damage through mildew and fungus, quartz silica is ground to a fine dust and then sprayed onto the vines in very small amounts (8grams/hectare). This draws out the humidity and intensifies the sunlight to dry the vine.
- An open canopy also allows air to circulate through the vines which is related to pruning and demonstrates the balance between people and the environment that biodynamic vineyards strive to achieve
- For bird control the vineyard uses netting and frost s are fought through overhead sprinklers and wind machines.

<u>Is Quartz Reef a sustainable vineyard?</u>

- Quartz Reef is 1 of only 6 biodynamic vineyards in NZ and is obviously part of SWNZ.
- It manages its water by making sure that the vines are in a sustainable environment that needs minimal water.
- The soil is carefully looked after through making sure that nutrients are put into it through organic composting and other additives such as valerian and chamomile.
- Rudi believes that the vines in Quartz Reef will last for between 40 – 60 years.
- However, he states that an important aspect of being sustainable is to understand the capacity of the soil and not to be too greedy by planting more than the environment can sustain
- In terms of economic sustainability, Quartz Reef wine has won awards nationally and internationally and Rudi is the only NZ winemaker to be nominated International winemaker of the year.
- The wine has found a niche market. Its biodynamic production gives it a point of difference that overseas markets are keen to buy.
- As Rudi says "You cannot be green if you're in the red'
- Rudi has concerns for future sustainability with water quality as dairy farming and artificial irrigation becomes more and more prevalent in the area.

SOME EXAMPLES OF OTHER SUSTAINABLE VITICULTURE PRACTICES

- Planting a mixed species permanent grass sward down the rows to prevent soil erosion.
- Grazing sheep through the winter saves mowing and keeps carbon emissions and soil compaction to a minimum
- Mulching prunings back to the soil to add organic matter
- Mowers which side discharges the grass cuttings to increase soil organic matter. It can also operate at higher speeds thus reducing the fuel used to do the job.
- Canopy management through pruning, shoot thinning and leafplucking reduces disease pressure and minimises spray use
- Planting over 700 Alnus Cordata as windbreaks and for bank stabilisation.
- Building retaining walls out of broken vineyard posts to protect stream banks.
- Nets cover the grapes and reduce bird damage.

8) Complete the table from the video clips from the above resources to produce specific evidence of sustainable practices on Central Otago vineyards – Focus on the work of Amisfield , Mt Difficulty and Quartz Reef to give specific details.

TASK 3 – Specific examples of sustainable practices in the Cromwell Area:

Sustainable use of water	Sustainable control of pests and diseases	Sustainable use of water
Explanation of why this is considered to be important:		
Specific examples from local vineyards:		