

Assessment Schedule – 2012**Agricultural and Horticultural Science: Demonstrate understanding of land use for primary production in New Zealand (91297)****Evidence Statement**

Question	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
ONE	Dairy conversions			
(a)	<p><i>Economic factors</i></p> <p>Until recently, low wool prices and prices of around \$60 for lambs have meant that sheep farmers were not receiving a level of income that could support both them and inputs into the farm. Prices in excess of \$100 per lamb are now being paid, and sheep farmers are experiencing their best weather conditions and economic returns for many years. The question is whether these high prices can be maintained. The greatly increased price for lamb and improving wool prices have tempered the rate of sheep farm conversions in the short term. Dairying has maintained high prices per kg of milk solids over a period of time – it is a profitable industry with a more reliable future.</p> <p>Dairy conversions involving the purchase costs of cows (at around \$1,500 each) a large rotary milking shed (\$1 million plus), and effluent ponds (\$2–400,000) are significant costs, but existing land and fencing do not require much alteration. Establishment costs usually require finance via borrowing. Older farmers are less keen to take on debt to establish a dairy farm, because of the reduced ability to pay off debt in their working lifetime. Because many are already debt-free, more of the (lower) income available from sheep and cropping can be taken as personal income rather than having to be used for loan repayments. Typically, other financial demands are also reduced by this stage, as a result of children leaving home.</p> <p><i>Environmental factors</i></p> <p>A Southland sheep farm is suitable for dairy conversion because the region provides an above-average rainfall consistently throughout the year, and this favours pasture growth that cows use as their main source of feed. A suitable Canterbury cropping farm will have the ability to irrigate and warm summer temperatures – both vital for pasture growth – and desirable ground conditions for grazing cows.</p> <p>Concerns exist that in a wetter region such as Southland, the increased use of nitrogen fertiliser and effluent disposal difficulties could result in wider destruction of natural wetlands. Regional councils are now requiring consent applications before approval is given, an action that is slowing down conversions to some degree.</p> <p>In Canterbury, increased water abstraction for irrigation is limiting the suitability of some areas for dairying, and the increased risks associated with urea and effluent on</p>	<p>In (a) Explains in general terms how ONE environmental reason <i>AND</i> ONE economic reason make the sheep and/or cropping farm suitable for conversion. Each reason must establish a link with feed / milk production or costs / prices.</p> <p><i>OR</i></p> <p>In (b) Explains in general terms TWO of the following reasons why increased cow numbers pose risk to New Zealand:</p> <ul style="list-style-type: none"> • economic • environmental • society. 	<p>In (a) Explains in detail how economic and environmental factors relate to the rate of dairy conversions.</p> <p><i>OR</i></p> <p>In (b) Explains in detail TWO of the following reasons why increased cow numbers pose risk to New Zealand:</p> <ul style="list-style-type: none"> • economic • environmental • society. 	<p>In (b) Evaluates aspects of dairy conversions by considering the positive <i>AND</i> negative aspects of increased cow numbers on economics, society, and the environment.</p>

		<p>farms with a porous soil is already causing concern and monitoring by councils.</p> <p>On both Canterbury cropping farms and Southland sheep farms, high soil fertility due to loam soil type and/or fertiliser application compliments the rainfall/irrigation for pasture growth, while the relatively flat land means that minimal energy is used for grazing. Collectively, these aspects allow for nutrition to be used for milk production.</p>			
(b)		<p>Increasing cow numbers throughout NZ reflect the fact that the dairy industry is capable of producing revenue that encourages farmer activity. Currently the dairy industry generates 25% of New Zealand's export income. Such income has a significant impact on society, and also helps determine the creditworthiness of the country and the ability of government to borrow money overseas. In good times, farmers spend money on farm inputs such as fertiliser and irrigation, which in turn provide jobs and income for people in the processing and servicing industries. Many small towns in New Zealand that were dying because of reduced opportunities have been revitalised by the spread of the dairy industry. Schools and doctors have been retained, due to the influx of staff associated with dairying.</p> <p>However, while these benefits are significant, there is a downside to the dairying boom, and that is the adverse effects dairying can have on the environment. There are some dairy farmers chasing high returns by increasing cow numbers who have disregarded regulations, and due to shortcomings in effluent return, fertiliser use, and water extraction, they have created long-term environmental and social problems. These in turn have economic implications for tourism, health, and market access. Environmental councils are concerned, and in Southland, resource consents are now required before dairy farms can be established.</p>			
Not Achieved	N1	Some writing, but does not explain why farmers are converting from sheep and crop production to dairying.			
	N2	Partial or inadequate explanation of why farmers are converting from sheep and crop production to dairying.			
Achievement	A3	Explains in general terms why farmers are converting from sheep and crop production to dairying.			
	A4	Explains in general terms, and with some supporting data/information, why farmers are converting from sheep and crop production to dairying. Reasons cover TWO of economic <i>OR</i> environmental factors <i>OR</i> societal impacts.			
Merit	M5	Explains in detail the economic and environmental factors associated with conversions from sheep and crop production to dairying. ONE factor is explained in detail, the other factor is explained.			
	M6	Explains in detail BOTH economic and environmental factors associated with conversions from sheep and crop production to dairying.			
Excellence	E7	Evaluates by way of comparison of impacts on the economy, with the impacts on <i>EITHER</i> the environmental <i>OR</i> social impacts of increased dairy cow numbers resulting from dairy conversions.			
	E8	Evaluates by establishing the relative importance of the impacts of dairy cow numbers on the economy, the environment, <i>AND</i> society. Reasons fully explained, with comprehensive supporting evidence.			

Question	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
TWO	Traditional hill country farming			
(a)	<p><i>Economic factors</i></p> <p>Hill country farmers do not have many options available to them, because of the topography and area of country, the variation of weather conditions, farm access, and remote location. Such factors impact on the economics of the operation, which must be profitable over the long term. Hill country properties have lower purchase price per hectare and lower production than many flat land properties, but their costs are lower due to lower input costs and labour. Beef, venison, and velvet undergo price fluctuations, however the production process cannot be changed quickly and farmers have to accept the price changes. Farmers are not in a position to hold stock till better prices come, and often sell store animals to down-country farmers. Fortunately, a mix of product for sale softens the blow of a low price for a particular product.</p> <p>The workforce requirements in the hill country have been reduced by the use of technologies such as helicopters, so the costs per hectare or person are reduced. In addition, many hill country properties have introduced tourism activities and pig-hunting experiences to boost income.</p> <p><i>Social factors</i></p> <p>Most hill country farmers value lifestyle and the environment. They are usually captured by the large open spaces, clean air, and freedom from the problems experienced in more populated areas. They enjoy working with livestock and utilising the recreational activities, such as hunting, that their diverse properties often provide. Farmers also appreciate natural vegetation, and have a desire to farm with this vegetation in a sustainable manner. Hill country properties tend to remain in families over generations as a result of the lifestyle and environment these properties provide.</p>	<p>In (a) Explains in general terms TWO reasons for continued traditional land use. Each reason must establish a link between environmental conditions and sheep, cattle, and deer farming.</p> <p>OR</p> <p>In (b) Explains in general terms TWO reasons why hill country farmers farm sheep, cattle, and deer. The reasons must cover two of the following considerations:</p> <ul style="list-style-type: none"> • economic • technological • social. 	<p>In (a) Explains in detail TWO reasons relating to economics and lifestyle why high country properties continue with traditional land use.</p> <p>OR</p> <p>In (b) Explains in detail TWO reasons why hill country properties continue with traditional land use.</p>	<p>Justifies the continued use of sheep, cattle, and deer by explaining their suitability to the land and its people, and why other options are limited.</p>

(b)	<p>Hill country farmers must make a profit in order to stay in business over time. Usually, profit is dependent on what they can produce, which is largely determined by topography and climate, the prices received, and costs. Hill country is limited to livestock production on a semi-extensive basis. Sheep and beef are able to be run, because they suit the country and require reduced supervision. They complement each other in the way they graze pasture and break in bush country, and also because they provide different sources of income at different times of the year from a mix of product for sale. This can soften the blow of a low price for a particular product.</p> <p>Deer are browsing animals well suited to bush country. They require more expensive fencing, but provide two sources of income – venison and velvet. Collectively, the different livestock species provide a regular cash flow and offer a buffer for variations in prices that must be expected. There are few alternative farming options that would provide a steady income, given the topography, climate, and vegetation available. Cropping and horticulture are not viable options – access, labour, machinery, and climate preclude them, so it is a case of selecting livestock suitable to the terrain.</p> <p>Farmers choose this type of country because it is different from the intensive farming practices on flat, fertile land. There is minimal machinery and cultivation, but horseback mustering appeals to those who work these properties.</p>			
-----	---	--	--	--

Not Achieved	N1	Some writing, but does not explain why hill country farmers continue to farm sheep, cattle, and deer.
	N2	Partial or inadequate explanation of why hill country farmers continue to farm sheep, cattle, and deer.
Achievement	A3	Explains in general terms why hill country farmers continue to farm sheep, cattle, and deer.
	A4	Explains in general terms, and with some supporting data/information, why hill country farmers continue to farm sheep, cattle, and deer. Reasons cover TWO of economic, <i>OR</i> social factors <i>OR</i> technological requirements.
Merit	M5	Explains in detail the economic and social factors associated with traditional use of hill country properties. ONE factor is explained in detail, the other factor is explained.
	M6	Explains in detail <i>BOTH</i> economic and social factors associated with traditional use of hill country properties.
Excellence	E7	Justifies the continued traditional use of hill properties by explaining how sustained use of the land can be supported by TWO of the following reasons: economic, technological, and social.
	E8	Justifies the continued traditional use of hill properties by explaining how sustained use of the land can be supported by ALL of the following reasons: economic, technological, and social. Reasons are fully explained, with comprehensive evidence.

N0 = No response; no relevant evidence.

Question	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
THREE	Kiwifruit dilemma			
(a)	<p><i>Economic factors</i></p> <p>The Bay of Plenty provided about 80% of the former \$1.3 billion export kiwifruit crop, and Psa has had a huge impact on both the green and gold varieties. It is the gold variety that has proved to be more vulnerable to Psa. The industry is expecting export volumes to drop significantly, and with it the incomes of growers in the Bay of Plenty. It is expected that the downturn will last for some time. Growers who have borrowed money are at risk of becoming uneconomic, and are not in a position to suffer losses on a regular basis.</p> <p>The area was once productive for dairying, due to favourable soils and climate. Land could be cleared and former orchards amalgamated to form a sizable dairying unit that could return high profits. The cost of milking sheds would be a factor, but other costs would be on a par with what was experienced with kiwifruit.</p> <p>Forestry could be considered, given the proximity to Tauranga and expertise in the area, but at present forestry is experiencing difficulties, and the long-term production process means that prices and returns are very difficult to forecast accurately.</p> <p>Other horticulture options such as avocados could be considered; there is a growing export market, but it is unlikely that the area currently in kiwifruit could be put into avocados without flooding markets.</p> <p><i>Social factors</i></p> <p>Kiwifruit production is the dominant land use in the region. It generates substantial income for the region and provides a large number of jobs, both full-time and part-time, that suits the local population. Any change to a different land use such as dairying would result in the loss of many jobs, particularly part-time, so it would be desirable on a social basis that any new land use was of a horticultural nature, with a higher labour requirement. Jobs would be retained, people would stay in the area, and services such as doctors and schools would be retained.</p> <p><i>Technological factors</i></p> <p>Whether growers should become desperate to stop production will hinge on the ability of scientists to find a solution. It is hoped that a Psa-resistant gold cultivar is found and then grafted onto a rootstock that is considered to be tolerant of Psa. While technology is vital to kiwifruit, it would also be important to alternatives such as dairying, where computerisation, shed design, and nitrogen inhibitors would assist production in a higher rainfall area such as the Bay of Plenty.</p>	<p>In (a) Explains in general terms TWO aspects that impact on a decision to change forms of land use. These must cover both economic and social/technological factors applicable to the Bay of Plenty.</p> <p>OR</p> <p>In (b) Explains in general terms TWO reasons why most growers will continue with kiwifruit. These must cover two of the following considerations:</p> <ul style="list-style-type: none"> • economic • technological • social. 	<p>In (b) Explains in detail TWO land use options that could be considered, based on economic and social/technological factors applicable to the Bay of Plenty.</p> <p>OR</p> <p>In (b) Explains in detail TWO reasons why most growers will continue with kiwifruit. These must cover two of the following considerations:</p> <ul style="list-style-type: none"> • economic • technological • social. 	<p>Justifies the decision to continue with kiwifruit by providing a response that highlights the advantages and disadvantages associated with economic, social, and technological factors.</p>

(b)	<p>Most growers will stay in kiwifruit production, being prepared to suffer short-term losses while science develops an answer to the Psa problem. Growers have invested heavily in their orchards, and if they sold out, what would be the reduction in price, and to whom would they sell the orchard as a going concern? Any new grower may choose to clear the orchard in favour of some other form of production. The shelter belts are in place, as is water reticulation, but if there were more profitable options, then other kiwifruit growers would also be enticed. By the time the new produce came into production (eg five years for apples), the cure for Psa is likely to have been found.</p> <p>The Bay of Plenty has developed an infrastructure that allows the area to service, harvest, process, and ship kiwifruit. Expertise exists in these sectors, and while some skills will be common to other primary products, there would be reluctance among growers to reject the structure they have put in place and have ownership of.</p> <p>The Bay of Plenty has a high population along the coastline that offers the opportunity for casual employment for picking and processing during a short period of time around June. This provides valuable income to businesses and the wider community, and the government could be expected to be very keen for production to continue, in the hope that science and technology will find a solution to the problem. Devoting government money to achieve this outcome must be a priority action.</p>			
-----	---	--	--	--

Not Achieved	N1	Some writing, but does not explain any alternative land use.
	N2	Partial or inadequate explanation of a plausible alternative land use.
Achievement	A3	Explains in general terms a realistic alternative land use.
	A4	Explains in general terms, and with some supporting data/information, a realistic alternative land use. Reasons cover TWO of economic <i>OR</i> social <i>OR</i> technological factors.
Merit	M5	Explains in detail BOTH the economic <i>AND</i> social or technological factors associated with existing or alternative land use. ONE factor is explained in detail, the other factor is explained.
	M6	Explains in detail BOTH the economic <i>AND</i> social or technological factors associated with existing or alternative land use. TWO factors are explained in detail.
Excellence	E7	Justifies the decision to grow kiwifruit by analysing the advantages and disadvantages of TWO of: the economics of land use, likely technological improvements, and social considerations.
	E8	Justifies the decision to grow kiwifruit by analysing the advantages and disadvantages of options in terms of ALL of the following: economics of land use, likely technological improvements, and social considerations. Reasons are fully explained, with comprehensive evidence.

N0 = No response; no relevant evidence.

Judgement Statement

	Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
Score range	0 – 7	8 – 12	13 – 17	18 – 24