

## Assessment Schedule – 2013

### Agricultural and Horticultural Science: Demonstrate understanding of how the production process meets market requirements for a New Zealand primary product(s) (91531)

#### Overall Sufficiency

Achievement	Achievement with Merit	Achievement with Excellence
<i>Demonstrate understanding</i> involves explaining how the production process meets the specific market requirements for a New Zealand primary product.	<i>Demonstrate in-depth understanding</i> involves explaining in detail how the production process meets the specific market requirements for a New Zealand primary product.	<i>Demonstrate comprehensive understanding</i> involves using detailed explanations to justify how the production process used meets specific market requirements for New Zealand primary products.

#### Question One: Quantity requirements

##### Assessment criteria

N0	No response; no relevant evidence.
N1	No useful information about quantity supplied to the market. Includes a basic (lacking detail or poorly linked) explanation of the effect of ONE management practice on quantity.
N2	Some information about quantity supplied to the market, described in general terms. Includes a basic (lacking detail or poorly linked) explanation of the effect of ONE management practice on quantity.
A3	Quantity supplied to the market is described in general terms. A basic (lacking detail or poorly linked) explanation of the effect of ONE management practice on quantity.
A4	Quantity supplied to the market is described in general terms. A basic (lacking detail or poorly linked) explanation of the effect of TWO management practices on quantity.
M5	Quantity supplied to the market is described using specific detail/data. Sound and thorough (use of data or well linked) explanation of the effect of ONE management practice on quantity.
M6	Quantity supplied to the market is described using specific detail/data. Sound and thorough (use of data or well linked) explanation of the effect of TWO management practices on quantity.
E7	A partial justification of a specific manipulation, but lacking detail/data <i>OR</i> no comparative manipulation.
E8	A full and comprehensive justification of a specific manipulation. Relevant detail/data <i>OR</i> comparative manipulation.

Q1	Evidence
(a)	The quantity supplied to the selected market is described, using specific detail / data / units.
(b)	<p>The impact / effect that each management practice has on the quantity supplied to the market is explained in detail.</p> <p><i>Example: Lamb</i></p> <p>A management practice affecting the lambing percentage (and hence quantity of lamb produced) is flushing ewes for the 35 days leading into tuppung. This involves putting the ewes on increased feed levels of high quality (ME 12 or more), to gain bodyweight and increase the ovulation rate prior to the ram being put out. This raises the likelihood of the number of multiples and the overall lambing by around 10% (typical response).</p>
(c)	<p>A complete and comprehensive justification of a specific manipulation of the management practice that includes relevant detail / data, AND explains why another management practice / manipulation is not as effective in maximising the quantity of product that can be supplied to the market.</p> <p><i>Example: Table potatoes – cultivar selection vs irrigation</i></p> <p>Growers choose cultivars based on a number of criteria, one of which is yield. However, the local fresh market requires potatoes that are 6–12 cm diameter. Some cultivars tend to produce bigger or smaller tubers (eg Agria – large tubers, Cliffs Kidney – smaller tubers). This has a major impact on the final quantity supplied to the market, as only those tubers that meet this size requirement get bagged for sale at premium prices suitable for the retail market. The potatoes that do not meet requirements often have to be sold as rejects such as for pig-food, where the price received does not cover the costs of production.</p> <p>Irrigation also has a significant impact on the size, and hence final quantity, supplied to the local market. Potatoes require about 450 mm of rainfall during the bulking-up phase of growth if the majority of the tubers that have been set are to reach the required size. In a dry area or in a drought, most of this water will have to come from irrigation. In these situations, regular irrigation of the crop with 10–30 mm water every 3–4 days (depending on soil type, wind, and temperatures) will have a greater impact on the quantity supplied to the market than cultivar selection.</p>

**Question Two: Attribute requirements****Assessment criteria**

N0	No response; no relevant evidence.
N1	Some information about an attribute requirement, but no link to the market.
N2	Some information about attribute requirements. A partial link to the market.
A3	An attribute requirement of the market is described in general terms. Basic (poorly linked) explanation of the reasons for the requirement.
A4	An attribute requirement of the market is described in general terms. Adequate explanation of the reasons for the requirement.
M5	Attribute requirement of the market is explained, using specific details/data. Partial description of ONE trade-off.
M6	Attribute requirement of the market is explained, using specific details/data. Description of TWO trade-offs.
E7	Attribute requirement of the market is explained, using specific details/data. A partial discussion of the possible trade-offs/disadvantages that might result from this attribute focus.
E8	Attribute requirement of the market is explained, using specific details/data. A full and comprehensive discussion of possible trade-offs/disadvantages that might result from this attribute focus.

<b>Q2</b>	<b>Evidence</b>
(a)	<p>The attribute for the selected product is clearly described, and connected directly with the market requirements for the product, eg Brix level in processed potatoes.</p> <p><i>Example: Processed potatoes</i></p> <p>These are required to have a Brix level of 5 or less.</p>
(b)	<p>The reason for the market requirement is explained.</p> <p>A Brix level of 5 or less is important because Brix levels greater than 5 can result in caramelisation of the sugars in the processed potatoes when fried, and the resultant French fry or crisp appears black and burnt, which is undesirable to the consumer.</p>

(c) A complete and comprehensive justification of the possible trade-offs/disadvantages that might result from the selected attribute focus, eg reduced yield, increased costs, or inflexible timing.

*Example: Processed potatoes*

In processed potato farming, there are opportunity costs that come with the business associated with gaining a McCain's contract, such as providing storage sheds. A significant issue with supplying a storage shed is the cost of the sheds, which can be up to \$5 million and will therefore limit the available spending within the farm on other crops or capital items such as machinery. In addition to the initial capital outlay, the farmer would also be required to spend significant amounts on electricity throughout the storage season. The electricity is required to maintain the air conditioning to ensure the crop is well ventilated; to keep CO<sub>2</sub> below toxic levels (preferably below 1 000 parts per million); and to keep the temperature above 8°C to avoid reducing sugars forming in the tubers that can result in caramelisation of the potatoes after frying.

Labour, whilst not significant, is a further requirement, as the sheds need to be monitored regularly, which creates further ties for the producer of processed potatoes. Therefore, should a farmer decide to build a storage shed, they are committed to a long-term investment in processed potato farming, which may limit their opportunities to diversify into other products not suited to the storage facilities. Having a storage shed, however, enables the farmer to be granted a lucrative and dependable McCain's contract for both supply and storage, due to their ability to manage the dry matter and Brix levels of the potatoes as required. Therefore a storage shed, whilst being a large investment for the farm, may eventually pay dividends if the farmer is willing to stay in the market for a number of years.

**Question Three: Quality requirements****Assessment criteria**

N0	No response; no relevant evidence.
N1	Minimal information about a specific quality requirement of the market. A basic (lacking detail) explanation of the effect of ONE management practice on quality.
N2	Relevant information about a specific quality requirement of the market. A basic (accurate, but limited in detail) explanation of the effect of ONE management practice on quality.
A3	A quality requirement of the market is described in general terms. A basic (accurate and detailed) explanation of the effect of ONE management practice on quality.
A4	A quality requirement of the market is described in general terms. A basic (accurate and detailed) explanation of the effect of TWO management practices on quality.
M5	A quality requirement of the market is described, using specific detail / data. Sound and thorough (use of data <i>OR</i> well linked) explanation of the effect of ONE management practice on quality.
M6	A quality requirement of the market is described, using specific detail / data. Sound and thorough (use of data <i>OR</i> well linked) explanation of the effect of TWO management practices on quality.
E7	Includes a partial justification of a specific manipulation, but lacking detail / data <i>OR</i> no comparative manipulation.
E8	Includes a full and comprehensive justification of a specific manipulation. Relevant detail / data <i>OR</i> comparative manipulation.

<b>Q3</b>	<b>Evidence</b>
(a)	<p>A quality requirement of the market is described in detail / using specific data.</p> <p><i>Example: Wool for carpet manufacture</i></p> <p>This typically has a fibre diameter of 30–38 micron (<math>\mu</math>), tensile strength above 35 N/Ktex, and a staple length of at least 90 mm to ensure that the wool fibres have the strength, length, and durability that carpet manufacturers require.</p>
(b)	<p>The impact / effect that each management practice has on the quality requirement is explained in detail.</p> <p><i>Example: Wool micron 30–38 <math>\mu</math> for carpet production – choice of breed: Romney</i></p> <p>A number of popular sheep breeds farmed in New Zealand produce wool suitable for carpet production. Breeds such as Romney have an advantage over other meat-focused breeds like Suffolk, and they produce wool within the required fibre diameter range, length, lustre, and colour required for woollen carpet production. Drysdale, which are a type of Romney, have modulated fibres that make their wool particularly suited to the carpet manufacturing market.</p> <p>Product storage after harvest impacts considerably on the Brix levels within processed potatoes. At temperatures below 8°C, potatoes become cold-stressed, and reducing sugars result from the starch being converted to sugar in order to provide energy to the potato. Therefore any processed potatoes that are not</p>

	immediately processed after harvest, need to be stored in specialised storage facilities that provide a controlled environment. The temperature is maintained at 8–11°C, the shed is continuously ventilated to ensure that CO <sub>2</sub> does not reach toxic levels (ideally below 1 000 parts per million), and the humidity is kept at levels above 95% to avoid shrinkage.
(c)	<p>A complete and comprehensive justification of a specific manipulation of the management practice includes relevant detail / data <i>AND</i> explains why another management practice / manipulation is not as effective in meeting the quality requirement of the selected market.</p> <p><i>Example: Lamb weights for lamb-plan contracts</i></p> <p>A key quality measure by which farmers are paid and lambs graded is carcass weight.</p> <p>By feeding ewes and lambs high quality / energy feed (11–12 MJME / kgDM) after lambing, lambs will be able to reach slaughter weight earlier than the main supply, or achieve heavier weights: 18–20 kg vs 14–16 kg. This manipulation is more significant than the time of mating / tupping.</p> <p>Even heavier sheep breeds such as Texel and Suffolk require high levels of feeding if lambs are to reach weights that will allow early season premiums to be taken advantage of. While they can reach higher carcass weights than other breeds, this is still dependent on high levels of nutrition – not just lambing early in the season (ie July).</p>

### Judgement Statement

	Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
Score range	0 – 8	9 – 13	14 – 18	19 – 24