

2021 VCE Agricultural and Horticultural Studies external assessment report

General comments

The 2021 VCE Agricultural and Horticultural Studies examination assessed content according to the VCE Agricultural and Horticultural Studies Study Design 2020–2025.

Most students attempted all questions of the examination, although overall the quality of responses lacked depth.

Students generally demonstrated a good understanding of appropriate land use and environmental degradations. Students drew connections between business practices and ethical considerations for farming operations.

Areas for improvement include knowledge of food provenance, climate change (especially the distinction between causes and effects of climate change) and sustainability and connecting these principles to actions by producers. Students need to improve their awareness and understanding of concepts of healthy rural and regional communities.

Students need to take into account the command words in each question and respond accordingly. This includes questions that have two elements, such as ‘identify and explain’, or two parts such as questions asking to explain and then comment on another approach in subsequent parts. Generally, students need to develop more detailed responses, giving specific examples to show their understanding and illustrate key ideas.

When preparing for the examination, students should refer to the current VCE Agricultural and Horticultural Studies Study Design and the examination specifications for Agricultural and Horticultural Studies. Students need to be able to apply their understanding to a range of land, plant and animal management techniques in agricultural and horticultural industries throughout Australia.

Specific information

Note: Student responses reproduced in this report have not been corrected for grammar, spelling or factual information.

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

The statistics in this report may be subject to rounding resulting in a total more or less than 100 per cent.

Question 1a.

Mark	0	1	2	3	Average
%	10	3	9	78	2.6

The required answers were:

- economic
- environmental
- social.

This question was generally well-answered.

Question 1b.

Mark	0	1	2	3	Average
%	37	28	26	9	1.1

Economic sustainability encompasses productivity, business activity, employment, tax burden and trade. Social sustainability relates to humans/individuals and covers equality, freedom, democratic decision making, safety, community livability, values, beliefs and land custodianship. Environmental sustainability considers natural resources, high energy consumption, solid waste generation, global greenhouse emissions, air and water pollution, environment damage and resource depletion. These are described in the cross-study specifications in the study design on page 8.

Responses could have included:

- Economic: provenance can increase prices consumers are willing to pay for goods, which increases money paid to producer; provenance can also reduce transport costs.
- Environmental: provenance can reduce environmental impacts, such as reducing emissions if transport is reduced, and environmental degradation associated with the movement of goods.
- Social: provenance can enhance the connection of consumers to the source of produce, or socially connect consumers to producers.

Overall, this question was not well-answered, with students unable to demonstrate an in-depth understanding of the concept of food provenance. Food provenance is knowing where your food comes from and how it is produced, transported and delivered to you. Most students struggled to link their response back to the three dimensions of sustainability.

Question 1c.

Mark	0	1	2	3	4	Average
%	13	15	30	19	23	2.3

Students were required to not only identify, but also explain, the challenges and opportunities related to food provenance. Many students did not correctly address this command term. Many students identified challenges or opportunities for consumers, not producers, so could not be awarded marks.

Examples of challenges were:

- tracking
- finding markets
- gaining consumer trust and confidence.

Examples of opportunities were:

- improved transparency and freshness
- increasing connectedness to brand
- new market prospects
- differentiating products from competitors.

Question 2a.

Mark	0	1	2	3	Average
%	8	34	43	14	1.6

Students needed to not only identify at least one way an ear tag helps maintain biosecurity (e.g. tracing animals in/out, identifying origins of animals) but to then describe how it does so. Students were typically able to identify examples, but needed to elaborate on their responses.

Question 2b.

Mark	0	1	Average
%	21	79	0.8

Most students were able to identify one way in which biosecurity measures can protect agricultural and/or horticultural industries. However, students need further understanding of the distinction between 'industries' and 'properties'.

Question 3a.

Mark	0	1	2	Average
%	3	23	74	1.7

Most students directly quoted information in the stimulus material. Some students inferred other advantages from the text. Marks were awarded in both instances if accurate and reasonable.

Question 3b.

Mark	0	1	2	3	Average
%	9	31	46	14	1.7

A large proportion of students were able to identify at least one way that a wool grower might assess the effectiveness of the robotic technology. For full marks, a description of how the method would be used was required. Examples of methods included:

- cost–benefit analysis of the robot versus labour costs
- conducting trials of numbers of sheep shorn with or without robotic arms
- comparison of injuries to sheep and quality of wool with and without robotic arms.

Question 3c.

Mark	0	1	2	3	Average
%	21	28	35	17	1.5

Most students discussed how robotic technology may impact a specific food or fibre industry; however, most responses focused on individual producers and needed to be elaborated to refer to wider impacts.

Question 4a.

Mark	0	1	2	Average
%	0.3	26	74	1.7

This question was well-answered, with the majority of students being able to list one advantage and one disadvantage of farming pigs in sow stalls. A wide variety of answers were applicable: advantages included cost- or space-saving, control of feeding and safety of piglets and sows; disadvantages included potential for disease, ethical concerns of consumers, discomfort of sows and working conditions of staff.

Question 4b.

Mark	0	1	2	Average
%	9	42	48	1.4

Specific actions on social media were accepted, as well as more general descriptions of strategies and their outcomes.

Responses could have included:

- changing perceptions of industry so consumers will no longer buy pork
- changing market appeal of pigs so consumers will not buy pork or choose an alternative
- reputation damage of pig farmers, harming their social relations with consumers.

Question 5a.

Mark	0	1	2	3	Average
%	39	21	24	15	1.2

This question was answered with a wide range of sophistication. There was, in general, limited knowledge of alternative growing media. Appropriate alternative growing media could have included:

- perlite
- vermiculite
- peat moss
- hydroponics
- aquaponics
- expanded clay balls.

If an incorrect medium was identified, consequential marks were given where possible for the subsequent question if disadvantages and advantages were relevant and accurate. A number of students incorrectly identified soil additives, such as fertiliser and fresh manure, as possible alternative growing media.

Question 5b.

Mark	0	1	2	Average
%	51	32	17	0.7

As with Question 5a., a range of responses were accepted, depending on the identified media. These included disease control/prevention, nutrient control and efficiency of production.

Question 6a.

Mark	0	1	2	3	Average
%	15	28	39	18	1.6

Most students were able to at least identify one effect of climate change on Australia's food and fibre production. Students needed to elaborate on how these effects impacted on food and/or fibre production in Australia.

Significant climate change effects included:

- floods, fire and drought – short-term shortage of product, long-term reduction in producing product and consumers changing consumption habits
- season reliability – change in types of crops, including sowing and harvest dates within regions
- risk management – farmers will have to rethink their risk-management strategies, including fodder storage, stocking rates, buying/selling water, employing staff and labour units needed for change.

Question 6b.

Mark	0	1	2	3	Average
%	19	36	32	13	1.4

Most students were able to answer what indicators and techniques can be used to test and monitor the environmental health of a property. Students were required to elaborate on the identified method/technique to receive full marks, for example, monitoring the pH of soil around the property and applying lime if the soil becomes acidic.

Question 6c.

Mark	0	1	2	3	Average
%	24	34	32	14	1.4

Students generally were able to identify an effect of reduced stocking rates; however, an elaboration on observable changes as a result was often lacking.

Responses included:

- reduced soil compaction
- reduced water use, increasing water availability on property
- increased pasture rejuvenation, including enhanced general vegetation on property, such as trees
- reduced fodder consumption and reduced reliance on use around property.

Question 7a.

Mark	0	1	2	3	Average
%	37	24	29	11	1.2

This question was generally not well-answered. Marks were awarded for strategies that responded to the effects of climate change on a property. Strategies aimed at reducing the causes of climate change could not receive marks, as this did not address the question.

Strategies included:

- tree planting to provide shade for animals and windbreaks
- responsible chemical use and correct application rates
- introducing fodder reserves when fodder is available or when it can be bought at a cheaper price
- reduced tillage to preserve soil structure and reduce erosion
- crop rotations, including breaking pest and disease cycles advantaged by climate changes, and introducing nitrogenous crops in rotations.

Question 7b.

Mark	0	1	2	3	Average
%	39	22	24	16	1.2

Most students were able to describe if their chosen strategy took a short- or long-term approach. Short-term was distinguished as being able to be implemented in the current cycle or growing season, while long-term is beyond that current cycle or growing season.

Students needed to identify both the strategy and its impact, and whether it was long- or short-term, to gain full marks. Ideally students would focus on the impact on Australia's food and fibre production, rather than impacts on a single producer or property.

Impacts included:

- farmers developing skills in selecting and planting trees
- change in chemical use
- change in feeding supplies and practices
- enhanced property management, including crop rotations, crops grown and water management
- change in equipment used to manage soil.

Question 7c.

Mark	0	1	2	3	4	Average
%	60	6	26	4	4	0.9

Most students were able to identify impacts, but needed to provide more depth in their responses in line with the 'evaluate' command word.

Students need to have an increased understanding of the difference between 'industries' and 'producers'.

Question 8a.

Mark	0	1	Average
%	58	42	0.4

A large number of students could not identify the pest provided in the photograph. The pest was a western flower thrip, one of the pests listed in the study design that students need to study. The most common incorrect answer was aphid.

If an incorrect pest was identified, consequential marks were given where possible for the subsequent questions if relevant and accurate to the initial pest identified.

Question 8b.

Mark	0	1	2	3	Average
%	31	30	30	9	1.2

Students' responses needed to describe both the mechanism of the pest's action and the visible effects on the host.

Hosts included:

- vegetables
- flowers
- fruit.

Examples of how the pest affects the host included:

- consuming part of the host and/or extracting sap and nutrients
- damage, with the formation of silvery patches or tiny black spots on leaves or buds
- leaving fruit or flowers damaged or scarred.

Question 8c.

Mark	0	1	2	3	Average
%	23	30	36	10	1.4

For full marks, students were required to describe the impact on the industry, not on an isolated producer.

Possible responses included:

- loss of crop supplied to market
- loss of producers due to reduced crop viability
- loss of producers due to reduced profitability.

Question 8di.

Mark	0	1	2	3	Average
%	35	41	19	6	1.0

Many students were unable to identify the distinction between control and prevention of a pest. Many students were able to identify a strategy, but did not elaborate or describe how to implement it. Western flower thrips have developed resistance to insecticides; many students didn't include this valid point of concern within their answer.

Possible responses included:

- a recommended chemical spray program
- removing/disposing/burning any remaining infested crops
- biological control including predatory bugs and mites.

Question 8dii.

Mark	0	1	2	3	Average
%	49	28	18	5	0.8

Again, many students were unable to identify the distinction between control and prevention of a pest. Many students were able to identify a strategy, but did not elaborate or describe how to implement it.

Possible responses included:

- removing weeds to reduce breeding sites
- encouraging predatory bugs and mites (natural enemies) in field

- biosecurity methods
- mass trapping involving sticky traps.

Question 9

Mark	0	1	2	3	4	Average
%	35	10	20	19	16	1.8

Most students could identify an example of a genetically modified organism (GMO) or had some understanding of issues related to the use of GMOs in food and fibre industries. Many students identified specific GMO products, without discussion of the wider industry.

In line with the study design, the stimulus had a focus on GMOs in Australian food and fibre industries. Based on student responses, it seems that many are not adequately aware of which industries in Australia are or could be using GMOs in their production of food and fibre.

Question 10a.

Mark	0	1	2	3	Average
%	4	19	39	37	2.1

Overall, this question was well-answered, with most students able to correctly evaluate the efficacy of the cane toad intervention.

Marks were awarded for each of:

- lack of effect; the cane toad did not control the cane beetle
- identifying that cane toads are poisonous to other animals and are spreading
- evaluative remarks, regarding that cane toads are now a pest themselves.

Question 10b.

Mark	0	1	2	3	Average
%	62	7	17	14	0.8

Students needed to describe the strategy, its purpose and success. Specific strategies/initiatives were preferred (e.g. not 'laws were introduced' in isolation of any examples).

Successful initiatives included:

- quarantining pests successfully
- fumigation of imports
- regulations and laws relating to GMOs and other new technologies
- past successful biological control initiatives.

Overall, students did not answer this question well. There seemed to be confusion of biosecurity initiatives and their impact and many students referred to current initiatives, meaning they could not describe their efficacy.

The following is an example of a high-scoring response.

The initiative to eradicate bovine Brucellosis from the Australian agricultural industry as everybody was on board with the plan and wanted to get rid of it. To achieve this strict biosecurity practices were put in place to stop the disease entering Australia, as well as the culling of all infected stock to initially eradicate it. Stock that are more susceptible are vet checked regularly and vaccinated against the disease. All of the measures have ensured that bovine Brucellosis [shouldn't] affect the Australian agricultural industry again.

Question 11a.

Mark	0	1	2	3	Average
%	67	20	7	6	0.6

Students had limited to moderate knowledge of milk fever. Many students thought milk fever is a metazoal or microbial disease that could be infectious, rather than a metabolic disease. Students needed to describe how the strategy would be implemented.

Strategies to prevent cows from getting milk fever included:

- testing the magnesium and calcium levels of milk
- monitoring diet, transition feeding, including benefits of alkaline diets, and reducing calcium intake to less than 50 g per day before calving
- monitoring age of herd, and replenishing with younger cows to reduce the risk of milk fever.

Question 11b.

Mark	0	1	2	3	Average
%	56	22	17	6	0.8

Many students conflated or confused prevention and control mechanisms. Students needed to describe how the strategy would be implemented.

Strategies to control milk fever in cows included:

- specific strategies such as injecting with a compound mineral comprising calcium, magnesium and phosphorus and glucose or calcium drenching immediately after a cow is diagnosed with milk fever
- maintaining optimum nutritional requirements during stages of pregnancy and after pregnancy.

Question 12a.

Mark	0	1	2	Average
%	26	61	13	0.9

The majority of students could correctly identify a strategy to monitor soil acidity. There was mixed knowledge of soil acidity, with some students getting confused with soil salinity. Students needed to describe the technique; however, many only named an indicator or type of test.

Identifying indicators other than laboratory analysis included:

- pH kits and meter kits for on-farm use, used to test samples from a range of locations
- monitoring symptoms in plants across the property, such as nodulation or stunted growth.

Question 12b.

Mark	0	1	2	3	Average
%	53	34	10	3	0.7

Causes of soil acidity included:

- formation of strong organic and inorganic acids
- excessive use of nitrogen-rich fertiliser and incorrect fertiliser rates
- rain water leaching away basic ions.

In order to receive full marks, students needed to explain how their identified cause acidifies soil.

Question 12c.

Mark	0	1	2	3	Average
%	42	32	20	6	1.0

Management practices that might improve soil acidity and increase crop yields included:

- spreading lime
- reduced stocking rates
- correct fertiliser usage.

The majority of students identified spreading lime as an effective strategy, but lacked depth of description of how this strategy altered soil chemistry.

The following is an example of a high-scoring response.

To improve soil acidity, a strategy that can be used is liming your soil to make the soil more alkaline and reduce the acidity of the soil. This will therefore promote a more ideal soil pH level for most crops to grow in and will therefore increase crop yield due to optimal soil and growing conditions.

Question 13

Mark	0	1	2	3	Average
%	31	38	21	9	1.1

Students had difficulty explaining their understanding of the *Occupational Health and Safety Act 2004*.

Responses identified that the Act helps keep farmers and workers safe, increases labour availability and lengthens workable lifespan. Links to the effects of these positive outcomes on sustainability of the business (social or economic) were required for full marks.

Question 14a.

Mark	0	1	2	Average
%	11	46	43	1.3

Overall, students were typically able to identify at least one challenge that arises from lack of access to physical and mental health supports.

Challenges included:

- longer waiting times before seeking support, potentially leading to lower levels of health / increased morbidity
- feeling of not being heard or seen
- fewer education opportunities
- higher instances of mental health problems.

Question 14b.

Mark	0	1	2	3	4	Average
%	14	24	43	15	5	1.7

A large proportion of students were able to identify a strategy that may overcome the challenges to physical and/or mental health identified in Question 14a. These included community events, social groups, field days and online services. In line with the command term, students needed to explain how their strategy would be implemented and the effects that it could have on the community/issues identified.

Question 15a.

Mark	0	1	2	Average
%	27	49	24	1.0

Most students were able to describe at least one advantage and one disadvantage for producers targeting niche markets. Students needed to describe the advantage, not just name it. References to 'profit' could not be awarded marks, as not enough information was provided in the stimulus to discern whether the supplier would or would not make a profit in the situation.

Possible advantages included:

- fewer competitors, allowing for higher sales
- premium prices from consumers
- social sustainability through selling in local community.

Possible disadvantages included:

- smaller markets potentially reducing sales opportunities
- reduced industry support and development due to niche nature of product/market
- few trials and examples on which to base production.

Question 15b.

Mark	0	1	2	Average
%	45	43	12	0.7

To achieve full marks, students needed to link how growing mushrooms as a by-product may be a way to value-add for the producer by making use of a cheap waste product and broadening markets. Many students were able to describe one of these factors, but often lacked the second.

Possible responses included:

- provide alternative form of income / new market
- recycling, increased environmental sustainability
- good use of waste material.