2018 VCE Agricultural and Horticultural Studies examination report

General comments

The 2018 Agricultural and Horticultural Studies examination assessed all parts of the study design.

Students showed a reasonable understanding of the modification of climate and soils; however, the understanding of causation and subsequent rectification of environmental degradation types needs further study.

The selection of appropriate new and emerging technologies by students continues to be a concern. The study design outlines succinctly the requirements for selection. The impacts new and/or emerging technology have on environmental, economic and social sustainability needs to be better understood by students.

A scenario focused on the development of a property management plan. Students struggled to demonstrate a good understanding of the purpose of a management plan or show how it could be used to determine best practice in improving the sustainability of the farm. Further emphasis on this aspect of the study design will help students' understanding.

Students were able to identify what gases contribute to global warming; however, they struggled to demonstrate how the effects of climate change will affect the productivity of the business.

Students need to develop more detailed answers to questions, particularly when they are asked for an extended response.

In general, many students were not able to give a considered response due to not understanding the context of the question.

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 businesses throughout Victoria.

This report should be read in conjunction with the 2018 VCE Agricultural and Horticultural Studies written examination.

Specific 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.

Marks	0	1	2	Average
%	19	38	43	1.2

Students were required to outline two methods to modify light levels in a commercial glasshouse or polyhouse. Possible responses included a reference to:

- shade cloth
- shade screens
- planting shade trees
- whitewashing
- artificial or supplementary lighting
- internal reflectors
- varying light wavelength.

Question 1b.

Marks	0	1	2	3	Average
%	19	32	23	25	1.5

Students were asked to describe three characteristics of a soil or potting mix that may be modified to get the best growing conditions for plants. Possible responses included:

- moisture content – watering, irrigation
- water retention
- aeration – air-filled, porosity/drainage
- fertility, nutrient levels
- temperature
- number of pest and/or disease organisms
- organic matter
- soil structure
- cation exchange capacity
- pH.

Adding clay to a sandy soil or similar was only accepted if the response also stated how this improved conditions.

Most students were able to show some understanding of the modification of soil or climate.

Question 1c.

Marks	0	1	2	3	Average
%	21	32	29	18	1.4

Students needed to state three methods of maximising the birthing percentages of livestock. These included:

- nutrition/water availability
- shelter
- pest/disease control
- temperature control
- animal hygiene
- minimise stress
- quarantine or segregation
- genetics

- monitoring/observation
- use proven sires
- join at best time of year for seasonal breeds
- birthing paddock close to house for ease of monitoring/access.

The focus of the question was on maximising the birthing percentage not on the care of the animal after it was born.

Question 1d.

Marks	0	1	2	Average
%	17	31	52	**1.4**

Students needed to identify one technique for modifying farm topography and outline one benefit associated with this technique. Possible responses included:

Technique	Benefit
laser levelling	• better control over water management • allows for precision irrigation, collection and recycling of irrigated water • reduces water entering and raising the water table (No marks were awarded for using the term 'flat'.)
contouring	• reduced runoff • retains moisture in the soil • reduced likelihood of soil erosion • safer use of tractors and other vehicles
terracing	• converts land that is too steep for cropping to land that can be cropped • increases the area available for crops • retains moisture • prevents the erosion of topsoil
raised beds	• improved drainage • less water-logging • reduced impact of compaction if vehicles always use hollows between beds

Question 2a.

Marks	0	1	2	3	4	Average
%	26	22	32	15	5	1.5

Ecosystem	Positive aspect	Negative aspect
natural	• more species and genetic diversity (no artificial selection) • nutrients recycled • matter does not leave system • populations maintained in equilibrium (limiting factors such as availability of food, predators, water, shelter) – natural checks and balances • greater biomass	• only solar energy, so lower net productivity (no additional nutrients, no pesticides so more competition for resources) • animals and plants face natural predation and the elements • cannot undertake an economic business • difficult to harvest for a business
managed	• additional energy input (e.g. nutrients) so higher net productivity • can run more stock • able to select nature of business (e.g. breed of animal, crop type) • can use artificial selection for advantageous genes • can operate a viable business while approximating a natural system	• fewer species and less genetic diversity (often a monoculture or a limited number of species, e.g. one producer, one herbivore, no carnivores) • the ecosystem is out of balance, which is why there are: – weeds – pests – diseases – overused land – reduced biomass Which can lead to: – over reliance on pesticides, herbicides and drugs – resistance to pesticides and herbicides – land degradation • natural recycling is limited • some of the steps in cycling of matter are missed (e.g. decomposition), which results in a less efficient use of energy and why inputs (e.g. fertiliser) are required

Most students were able to state one or more advantage(s) or disadvantage(s) of a natural or managed system.

'Natural and managed ecosystems' is a core component in the study design. The advantages of a natural ecosystem and the disadvantages of a managed system are often highlighted throughout the year. The advantages of a managed system and the disadvantages of a natural ecosystem should also be covered.

Question 2b.

Marks	0	1	2	3	4	5	6	Average
%	10	7	20	25	14	11	14	3.2

Students needed to identify two types of land or soil degradation and describe a possible cause and strategy to rectify each.

Most students were able to identify a form of environmental land degradation; however, the majority of students had difficulty in stating a possible cause or a rectification strategy. A number of students identified state erosion, which was unacceptable as it is not specific enough.

Question 2c.

Marks	0	1	2	3	Average
%	31	15	30	23	1.4

Students were asked to identify one water quality issue, describe the impact it could have on a business and suggest a rectification strategy.

Water quality issue	Impact	Rectification strategy
pH	• The acidity (or alkalinity) of a water supply can affect plant growth (uptake of macro or micro nutrients). • Pesticide efficiency can be affected with the potential outcome a pest-affected crop. • Palatability for stock water could be affected.	• Test pH of water and add appropriate acid or alkaline substances depending of the future use of the water. • Reduce irrigation runoff.
iron	• If water with high soluble iron is applied by spray, it can discolour leaves and reduce the efficiency of photosynthesis. • Palatability for stock water could be affected.	• Test water, recommended treatment to remove iron is oxidation, sedimentation and then filtration. • Procedures used include aeration and settling, chlorination and use of potassium permanganate.
salinity	• Water with a high salt concentration limits the ability of plants to take up water. • Palatability for stock water could be affected.	• EC test, retain native vegetation and maintain good pasture growth
turbidity	• Palatability for stock water could be affected. • If irrigating, the suspended particles can cause blockages in pipes, drippers and sprinklers, affecting water available to plants.	• stock exclusion • fence off the dam, control access • grassed waterways catchment for filtration • use flocculating agents (e.g. alum) • reduce pumping • reduce infestation of fish, such

		as European carp • control storm water flows, reduce upslope erosion • avoid bank erosion • add lime or gypsum • add straw
algal bloom/eutrophication	• Contaminated water can poison stock. • Can delay harvest or contaminate crop if there has been a recent watering from the contaminated water.	• Avoid over use of nitrogen- or phosphorus-rich fertiliser. • Avoid fertilising on slopes just before heavy rain. • Vegetate waterways catchment for filtration.
bacterial growth	• Contaminated water can cause disease in stock. • Can delay harvest or contaminate crop if there has been a recent watering from the contaminated water.	• Stock exclusion • Fence off the dam, control access • Avoid run off from manure ponds • Increase number of ponds

Question 2d.

Marks	0	1	2	Average
%	51	36	13	**0.6**

Students were asked to describe two environmental indicators that could be used to evaluate the success of the rectification strategies described in part b. and part c.

Some examples of environmental indicators include:

- soil – structure, texture, pH, fertility
- extent of bare soil
- extent of soil erosion
- area of salt-affected land
- extent of mass wasting (landslips, slumps)
- abundance of weeds, pests or vermin
- tree cover
- area of remnant vegetation
- water table level
- groundwater salinity
- stream water turbidity
- diversity of macro-invertebrates in the water
- diversity of flora and fauna in the water

Students needed to show an understanding of the environmental indicator and how it is used. Many students were able to list an environmental indicator but were unable to describe how it was used to monitor the problem.

Question 3a.

Marks	0	1	Average
%	51	49	**0.5**

Two non-grass broadleaf weeds given in the prescribed list with flowers that are mainly yellow were required to be listed. The correct responses were:

- capeweed
- gorse/furse.

Students needed to know both plants to obtain full marks.

Question 3b.

Marks	0	1	Average
%	90	10	**0.1**

Students needed to state the responsibilities of Victorians with regard to restricted weeds such as Chilean needle grass. Responses should have been:

- Trade in these weeds is prohibited, as plants, seeds or contaminants in Victoria.
- Farmers must ensure that seeds do not contaminate hay or seed leaving their property.

Students were awarded marks whether they specifically mentioned Chilean needle grass or were more general in their response.

This question was not well answered.

Question 3c.

Marks	0	1	2	Average
%	36	47	17	**0.8**

Students were asked to give two reasons why the use of herbicides may have undesirable consequences when used in market gardens, broadacre cropping, grazing enterprises and other agricultural and horticultural businesses. Suggested answers included:

- may create bare patches prone to reinfestation of weeds
- the build-up of herbicide resistance may reduce the effectiveness of the herbicides
- non-target species may be affected due to spray drift
- plants and animals in waterways may be affected
- incorrect use may lead to health issues for operators and neighbours
- withholding period not being adhered to may lead to herbicides in the animal/human food chain.

The majority of students were able to give one acceptable response but struggled to give two. The use of herbicides and their effects, both positive and negative, is an important aspect of weed control.

Question 3d.

Marks	0	1	2	3	4	5	6	Average
%	8	9	18	14	18	19	14	**3.4**

Students were asked to select a weed from the prescribed list and identify and describe two methods of controlling it, including the best time to implement each method. Any chemical controls mentioned needed to include the name of the main chemical used.

High-scoring responses included the application method, rates of application and chemical action. No marks were awarded if students discussed blackberry or gorse infestations in crops.

Question 3e.

Marks	0	1	2	Average
%	18	55	27	**1.1**

Students were asked to describe two financial impacts that their chosen weed could have on an agricultural or horticultural business.

This question was generally answered well, with students being able to state at least one financial impact on a business.

Question 4a.

Marks	0	1	2	Average
%	21	42	37	**1.2**

Students were asked to choose a pest or disease from the prescribed list and explain how their chosen pest or disease affected its host.

Question 4b.

Marks	0	1	2	Average
%	40	37	23	**0.9**

Students needed to state two methods of preventing the chosen pest or disease from entering an agricultural or horticultural property.

Students were generally able to state one method of prevention but struggled with the second. Students who had studied a pest or disease in detail were able to give a complete response. Biosecurity is a major focus in the study design.

Question 4c.

Marks	0	1	2	Average
%	39	31	31	**0.9**

One method of monitoring the chosen pest or disease was required. A description of how this method would be implemented was also required.

Most students were able to state a monitoring method but only some could describe how it should be implemented.

Question 4d.

Marks	0	1	Average
%	56	44	**0.5**

Students needed to state how the results of monitoring the chosen pest or disease would influence any further action to be taken.

Students needed to include an answer that related to determining an economic threshold for the chosen pest or disease and then deciding whether to act, maintain monitoring or undertake a similar action. The majority of students found this question challenging.

Question 4e.

Marks	0	1	2	3	Average
%	22	34	28	16	**1.4**

An explanation of how the chosen pest or disease could be controlled was required. Any chemical controls mentioned needed to include the name of the main chemical used.

Approximately half of the students were able to give a basic explanation of how to control the chosen pest or disease. Only a small number could give a detailed and complete response to this question. Students should be fully aware that a comprehensive approach to controlling the pest or disease is required, which includes, where possible, a biological, cultural or chemical method.

Question 5a.

Marks	0	1	2	Average
%	53	36	11	**0.6**

Using the scenario, students were required to demonstrate an understanding of a property management plan. Students needed to explain why it was advisable for Sally to develop this plan. Responses included:

- recognise and highlight areas of concern on her property
- design a series of steps to improve the viability of the farm with a timeline
- increase social, environmental and financial sustainability of the farm
- sustainable use of resources
- minimum use of resources gives lower cost of production
- allows farmer to make informed decisions.

This question was not well answered. The development of a property plan gives context to many aspects of sustainability in agriculture and horticulture. Students need to better understand the reason for developing such plans.

Question 5b.

Marks	0	1	2	3	4	Average
%	38	18	14	9	21	**1.6**

Students were asked to outline the steps involved in developing a property management plan. Responses should have included:

- vision, values and purpose
- aerial photograph/map
- acetate sheets or computer layers:
- current situation
- infrastructure
- problem areas
- future plans

Question 5c.

Marks	0	1	2	3	Average
%	54	36	9	2	**0.6**

Students needed to explain how Sally could use a property management plan to maintain the biodiversity of her remaining bushland and indigenous fauna.

Using the property management plan allows her to:

- identify and map and remnant vegetation
- develop fencing plans for protection
- plan wildlife corridors
- join remnant vegetation areas in the wildlife corridors
- create a riparian zone
- place a covenant/caveat on remnant vegetation.

Question 5d.

Marks	0	1	2	3	Average
%	18	34	37	11	**1.5**

Students were required to suggest what plans Sally could make to stop further degradation of the areas around the stream. Possible responses included:

- fencing of the stream
- creating stock watering points – troughs
- planting riparian zones along stream
- deep ripping compacted areas, re-sowing and fencing.

Question 5e.

Marks	0	1	Average
%	78	22	**0.2**

Students needed to name one government regulation that requires Sally to fix the problems along the stream. Possible responses include:

- The Victorian *Catchment and Land Protection Act 1994*
- *Water Act 1989.*

Overall, this question was not well answered. Students were not able to give the names of the Acts that related to the problems on Sally's property.

Question 6a.

Marks	0	1	2	3	4	5	6	Average
%	11	6	16	17	15	15	20	**3.4**

Students were asked to choose two new or emerging technologies they had studied and describe how each worked and then name the technology they replaced or the problem they solved. A possible response is shown below.

Chosen technology	Description	Technology replaced or problem solved
1. sexing chickens in the egg	Before they hatch, the sex of chickens can be determined by using a protein from a jellyfish, which fluoresces green under ultraviolet light. The protein is inserted in the rooster sperm, the hen is artificially inseminated and the chick's sex can be determined by observing whether the chick's skin glows under ultraviolet light. If it glows, the chick is male. If it does not glow, the chick is female.	manual sexing (vent sexing) after hatching
2. robotic rotary dairy	This technology works on the principle that cows will come onto a rotary platform to be milked by individual stall robots or robotic arms. The rotary platform and shed are the same as a conventional rotary, except the cows are milked by robots using laser technology for placement of cups instead of humans putting the cups on.	a conventional dairy (e.g. rotary or herringbone), in which cows are milked by a human with machines

Students could generally name a new and emerging technology; however, the description was often lacking in content. Some students listed technologies that were not acceptable. The study design states that a 'new technology is defined as having been available for fewer than five years preceding the year of study; emerging technology is still in the development stages and not commercially available'.

Question 6bi.

Marks	0	1	2	Average
%	33	38	29	**1**

Students needed to outline two reasons why an agricultural or horticultural business would choose to invest in the first technology chosen in part a.

Sexing chickens in the egg:

- cost effective for farmers as they can decide not to continue incubating male chicks
- animal welfare concerns are lessened as the males are destroyed earlier and are not seen as fully developed living organisms
- 98 per cent accurate
- more efficient use of power with the incubators as farmers are not incubating males
- twice as many females can be incubated for the same cost

Most students could state one reason for investing in the technology; however, only a third of the students could state two.

Question 6bii.

Marks	0	1	Average
%	68	32	**0.3**

Apart from cost, students needed to state one disadvantage of adopting the technology. For example:

- It is genetic modification by inserting a jellyfish protein into rooster sperm.

- There could be consumer backlash from the genetic modification (i.e. loss of income because people will not eat eggs from genetically modified hens, even though the hens do not have the protein).
- There is still an ethical dilemma involved in destroying male embryos in the egg.

This question challenged a large number of students. Many struggled to identify a disadvantage, such as a negative social implication of this technology, other than cost.

Question 6c.

Marks	0	1	2	3	4	5	6	Average
%	36	6	13	20	15	7	2	2.1

For the second technology chosen in part a., students needed to evaluate the positive and negative impacts on all three aspects of sustainability. The following is a possible response.

Aspect of sustainability	Positive impact	Negative impact
environmental	• With any new dairy, the EPA is very strict on effluent, so a new dairy would have to have the most efficient effluent and treatment system so there is no risk of runoff into waterways. • Soil degradation, such as compaction, would be reduced as the cows are not waiting at gateways and herded in large groups.	• The platform is running for 24 hours, which means the electricity usage could be contributing more than a conventional rotary to greenhouse gases in the atmosphere. • Uses more water with the continual washing of cups and cow's teats. • Costs more to cool the milk because milk is going into the vat all the time.
economic	• In the long term (5 years) it will pay for itself in the saving on labour costs (time and money). • Saving money on antibiotic treatments, the risk of high cell count milk reducing income and vet bills with the hygienic setup of the rotary robot. Less culling of cows and loss of income. • When selling cows, the extensive information stored in the computer allows you to put a premium price on the animals or their progeny. • Cows that are not being herded and can wander up to the dairy in their own time will have less lameness, which reduces treatment costs and loss of milk production. • Less wear and tear on the cow tracks, so reduced costs of track maintenance. • Less wear and tear on the cow's udder because she can be milked more than twice a day, which releases the pressure on the	• The initial set-up cost is very high because of the robots, including making it as energy efficient as possible as the platform is running all day and night. • It takes around five years to see any real labour-saving benefit. • It is not cost-effective for smaller herds.

	udder. Cows should then last longer, reducing cull rates and surplus heifers can be sold (more income).	
social	• It is seen as more natural for the cow as she can be milked when she wants to be milked (animal welfare). • Cows are not being herded twice a day, but wander up to the dairy when they want to be milked and fed (less stress). • Reduces the farmer's routine workload, so they can do other jobs around the farm or spend time with family. • Reduces cross-contamination (cups washed before and after), which leads to reduced mastitis outbreaks and fewer cows sick or sold. Also less use of antibiotics (less risk of resistance).	• Loss of milking jobs, which can affect families and the wider community • The farmer is on call 24/7 if something goes wrong on the platform. • The robots cannot pick up visual signs of cows with diseases or in distress, so this could be an animal welfare issue.

This question was not well answered. Students need to make sure that they cover all positive and negative aspects of the technology they have researched in terms of economic, social and environmental sustainability.

Question 7a.

Marks	0	1	2	3	Average
%	5	15	16	64	**2.4**

Students were required to name the major greenhouse gas produced as a result of each of the processes or activities listed in the table below.

Process or activity	Major greenhouse gas produced
use of tractors around a farm	CO_2 (carbon dioxide)
digestion process in ruminant animals	CH_4 (methane)
decomposition of animal urine	N_2O (nitrous oxide)

Question 7b.

Marks	0	1	2	Average
%	47	26	27	**0.8**

Students had to identify two expected changes to Victoria's climate as a result of global climate change. Possible responses included:

- more frequent extreme natural events such as storms, heat waves, drought and flooding
- increase in mean/average (annual) temperature
- increased frequency of very hot days
- decrease in average (annual) rainfall

- shift in rainfall patterns.

This question was not well answered due to students not clearly stating the effects of climate change.

Students needed to include a timeframe, for example, ‘annual’ when stating a decrease in rainfall/temperature.

Question 7c.

Marks	0	1	2	Average
%	58	24	18	**0.6**

Students were required to choose an agricultural or horticultural business they were familiar with and explain how each change listed in part b. could potentially have an impact on the business.

For all business types:

Expected change to Victoria’s climate	Potential impacts (Question 7c.)	Possible management strategy (Question 7d.)
increased occurrence of extreme weather generated events (e.g. floods, storm, drought, bushfire)	• Impact will vary from minor to severe/disastrous. Has the potential to affect/harm people (physical and mental health), livestock, fencing, infrastructure, and bring the business to a halt. • The loss of the electricity supply would be crippling for many businesses (e.g. dairy could not run). • Cool stores and refrigeration would be inoperable.	• Losses are inevitable, but these can be minimised by having a plan for each type and level of emergency. • Perform risk assessment of the entire business in the face of the extreme event. • Consider upgrading business insurance. What might be worth insuring? • Try to organise backup for essential processes (e.g. power generation).

Question 7d.

Marks	0	1	2	3	Average
%	34	32	24	10	**1.1**

Students had to explain a potential management strategy that their chosen business could implement to counteract the impact of climate change and to maintain its current production levels.

Suggested responses are given in the table for Question 7c. The question did not ask for just a list of three strategies.

Students found these questions challenging, with only a small number able to show a good understanding of impacts on their chosen business and a potential management strategy. Further work is required by students on the impacts to agricultural and horticultural businesses and potential solutions.

Question 8a.

Marks	0	1	2	Average
%	41	40	19	**0.8**

Students were required to choose one type of agricultural or horticultural business they were familiar with in terms of business operations and indicate its main product or service. Students then needed to describe one quality standard for the main product or service indicated.

For every product there are always several quality standards. For canola the quality standards are protein content, moisture content, heat, frost, insect, mould damage, foreign matter, weed seed content and split or broken seeds.

Examples for other products that were accepted include:

- weight of animal within market specification
- quality of packaging
- protein content in milk
- extent of blemishes on fruit
- protein level in grain
- total bacteria and somatic cell counts are used worldwide to assess milk quality
- fat cover in livestock
- micron diameter of wool
- colour of meat/eggs
- fat colour on meat.

Over half of the students could list a quality standard but only a few could describe it.

Question 8b.

Marks	0	1	Average
%	65	35	**0.4**

Students were required to state how the quality standard described in part a. is measured.

Depending on the standard, possible responses included:

- some can be visually assessed (e.g. the number of blemishes on fruit and vegetables, colour charts for egg yolks or meat)
- some require an instrument (e.g. samples of fleece that are taken from individual sheep are submitted by sheep breeders and wool growers for the measurement of fibre diameter/micron using a Laserscan instrument/microscope)
- some require chemical analysis (e.g. extraction methods to determine the amount of protein or oil in canola)
- all quality standards must be measurable.

Few students could adequately describe how the quality standard could be measured.

Question 8ci.

Marks	0	1	2	Average
%	26	22	53	**1.3**

With reference to the chosen business students needed to give two inputs that were required. These could have been:

- For milk production: cows, feed, labour
- For peach orchard: peach trees, fertiliser, water
- For free-range eggs: hens, feed, water

The input of money was not accepted.

Question 8cii.

Marks	0	1	2	Average
%	46	36	18	0.7

Students were required to choose one process and explain how their chosen business should monitor and manage this process to maintain appropriate quality standards.

The monitoring and management of a business's inputs, processes and outputs to ensure quality standards are achieved and maintained could have included the following:

Inputs:

- lack of impurities
- correctly formulated
- within use-by dates
- always available when required
- produced in an ethical manner
- produced in a sustainable manner
- produced by appropriate and up-to-date equipment
- healthy trained workforce used to produce inputs
- procedural manuals for use of inputs available where appropriate

Processes:

- efficient (done to appropriate standards)
- timely
- safe
- hygienic
- no stress or inappropriate practices on animals or employees
- sustainable (three areas) management/maintenance practices
- ethical procedures

Half of the students could describe how a process could be monitored to maintain appropriate quality standards.

Question 8d.

Marks	0	1	2	Average
%	40	43	18	0.8

Students were asked to describe two methods that could be used to analyse the financial performance of their chosen type of business. Possible responses included:

- profit/loss statements
- production costs
- actual cash flows and returns
- budget
- percentage return on capital invested.

Students are required in the running of their business throughout the year to analyse their financial performance. Further focus on this area is needed as many students could not name a method of analysis regarding revenue.

Question 8e.

Marks	0	1	2	3	Average
%	24	22	16	38	1.7

Students needed to outline the key components to be included in the business plan for their chosen type of business. Possible responses included:

- vision/goals/aims
- production schedule/plan
- a financial plan including an overall budget and input/output costing over time
- marketing plan, including products to be supplied and market requirements (product, people, price, promotion, placement)
- establishment costs and ongoing production costs
- expected cash flows and returns
- access to inputs
- timeline
- quality assurance
- environmental impacts.

Most students had some understanding of creating a business plan. Just under half of the students demonstrated an excellent understanding.

Question 8f.

Marks	0	1	2	3	Average
%	63	7	14	16	**0.9**

Students were required to give one water management technique that their chosen type of business could use to show that it uses water wisely. They also needed to explain how the technique made the water management more sustainable. Possible responses included:

Technique	Explanation of how water management is more sustainable
conservation	use less water (e.g. different crop)
recycling of water	settling ponds/effluent ponds
irrigation	improved methods
water harvesting	tanks if they allow conservation of town/bore water

This question was challenging for the majority of the students. Students could not relate their chosen business to a water management technique.