

Agricultural Reports: Science as a Human Endeavour

In this task you have the opportunity to explore and investigate a contemporary example of how agricultural science interacts with society.

You will analyse and synthesise information from different sources to explain the science relevant to the focus of their investigation, show its connections to science as a human endeavour in an agricultural context, and draw your own conclusions.

Topic selection

Select and explore a recent discovery, innovation, issue, or advancement linked to one of the topics in the Stage 2 course. Possible topics include:

guidance systems, individual animal management, spray technology, weed recognition, wool fibre analysis, precision seeding, precision watering systems, soil moisture monitoring, yield mapping, grain quality monitors, computer controlled feeding (dairies), climate control in glasshouses, robotics, unmanned aerial vehicles (drones), virtual fencing, telemetry, swath control / section control

Select an article from a recent industry publication such as the Stock Journal or an article from the Internet, which highlights connections between agricultural science and the SHE concepts. You should select one that is not being used by another student. Check it's suitability with your teacher.

Map the article for the key SHE concepts using annotations, a chart, concept map or similar.

Write brief notes explaining how the discovery, innovation etc. relates to one or more key SHE concepts.

Progress check _____

Folio research

Using the key SHE concept(s) you have selected, conduct further research to expand your understanding of the ideas from the article. You could search for related articles, data, fact sheets, You-tube clips, information from industry contacts etc. Your research may remain within the initial agricultural area or could extend to areas of agriculture other than those covered in the original article.

Collate your research in to a Folio format (could be digital or hard-copy)

Annotate each part of your research showing how it links to the key SHE concept(s) you have identified and the relevant agricultural concepts.

Progress check _____

Report (KA2, KA3, KA4)

Choose the format for your report.

The report should be a maximum of 1000 words if written or a maximum of 6 minutes for an oral presentation, or the equivalent in multimodal form.

Format A - Poster

The guidelines for preparing your poster are as follows:

- A3 size, printed in colour (printing credit provided)
- Prepared using PowerPoint (one slide, select A3 in the Design tab) or other similar software
- Include a clear title and your SACE ID number
- Text should be kept to a minimum and use a large, clear font
- Relevant images, graphs, or data tables can be included. These need to be labelled and referred to in the text.
- Suggested layout: portrait– 2-3 columns, landscape – 4-5 columns

The word limit for the poster is 500 words.

In small groups, display your poster and discuss it with your peers and teacher. This will happen in an informal setting, with all class members participating in the peer assessment process. You will be expected to discuss the ideas you have presented and provide information and detail to communicate your learning in this area.

The word limit for the discussion is 500 words.

Your final grade for the presentation will be a combination of the peer assessment and your teacher's assessment.

Format B – Essay

Use the following dot points as a guide to construct your essay. The essay should be a maximum of 1000 words.

- an introduction to identify the focus of the investigation and the key concept(s) of science as a human endeavour that it links to
- relevant agricultural science concepts or background
- an explanation of how the focus of the investigation illustrates the interaction between agricultural science and society
- an explanation of the purpose, potential impact, or significance of the focus of the investigation, e.g. further development, effect on quality of life, environmental implications, economic impact, intrinsic interest
- a conclusion
- citations and referencing.

Draft due date _____

Final due date _____

Performance Standards for Stage 1 Agricultural Production/Systems

		A	B	C	D	E
1 Investigation, Analysis and Evaluation	1	Designs a logical, coherent, and detailed agricultural investigation. Obtains records, and represents data, using appropriate conventions and formats accurately and highly effectively. Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification. Critically and logically evaluates procedures and their effects on data.	Designs a well-considered and clear agricultural investigation. Obtains, records, and represents data, using appropriate conventions and formats mostly accurately and effectively. Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification. Logically evaluates procedures and their effects on data.	Designs a considered and generally clear agricultural investigation. Obtains, records, and represents data, using generally appropriate conventions and formats with some errors but generally accurately and effectively. Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification. Evaluates procedures and some of their effects on data.	Prepares the outline of a agricultural investigation. Obtains, records, and represents data, using conventions and formats inconsistently, with occasional accuracy and effectiveness. Describes data and undertakes some basic interpretation a basic conclusion. Attempts to evaluate procedures or suggest an effect on data.	Identifies a simple procedure for a agricultural investigation. Attempts to record and represent some data, with limited accuracy or effectiveness. Attempts to describe results and/or interpret data to formulate a basic conclusion. Acknowledges that procedures affect data.
	2	Demonstrates deep and broad knowledge and understanding of a range of agricultural concepts. Develops and applies agricultural concepts, skills, and practices highly effectively in new and familiar contexts. Critically explores and understands in depth the interaction between agricultural science and society. Communicates knowledge and understanding of agriculture coherently with highly effective use of appropriate terms, conventions and representations.	Demonstrates some depth and breadth of knowledge and understanding of a range of agricultural concepts. Develops and applies agricultural concepts, skills, and practices mostly effectively in new and familiar contexts. Logically explores and understands in some depth the interaction between agricultural science and society. Communicates knowledge and understanding of agriculture mostly coherently with effective use of appropriate terms, conventions, and representations.	Demonstrates knowledge and understanding of a general range of agricultural concepts. Develops and applies agricultural concepts, skills, and practices generally effectively in new or familiar contexts. Explores and understands aspects of the interaction between agricultural science and society. Communicates knowledge and understanding of agriculture generally effectively using some appropriate terms, conventions, and representations.	Demonstrates some basic knowledge and partial understanding of agricultural concepts. Develops and applies some agricultural concepts, skills, and practices in familiar contexts. Partially explores and recognises aspects of the interaction between agricultural science and society. Communicates basic agricultural information, using some appropriate terms, conventions, and/or representations.	Demonstrates some limited recognition and awareness of agricultural concepts. Attempts to develop and apply agricultural concepts, skills, and/or practices in familiar contexts. Attempts to explore and identify an aspect of the interaction between agricultural science and society. Attempts to communicate information about agriculture.
	3					
	4					
Knowledge and Application	1					
	2					
	3					
	4					

Stage 1 Agriculture

Science as a human endeavour assignment

Walk over weighing and remote camera monitoring

The science as a human endeavour concept discussed will be development, application and limitation. This report will discuss how the walk over weighing and remote camera monitor has been develop to improve the livestock industry, what the limitations are and the application.

The walk over weighing system and remote camera monitoring has enabled new emerging technology to be developed. Which assists farmers to improve their livestock production. This new emerging technology is becoming more and more popular in the farming business. It is being used within the beef/ dairy industry, sheep, goats and pigs. The Walk over weighing (WOW) and remote camera monitoring within the cattle (beef and dairy) industry is growing rapidly and evidence has shown that it is improving the cattle production, the weight of the cattle through less people interactions, decreasing the costs of mustering and be able to monitor each individual's cattle's body condition, health and how much they drink (Black, 2011).



Figure 1: The Walk over weighing

The walk over weighing system and remote camera monitoring was created, to pinpoint timing of sale, improve live weight performance, *'trigger points for making*

key management decisions for timing of supplementation and gauge effectiveness of supplementation' (Black, 2011), monitor water trough levels and pasture condition remotely (Black, 2011). The Conversation created by Dave Swain Professor of Agriculture, CQUniversity Australia describes how this technology is changing the face of northern Australian cattle farming. With this emerging technology he states, "Managing the cattle will be easier and cheaper" (Swain, 2014). CRC-REP (Cooperative Research Centre for Remote Economic Participation) has been building a new project that is designed to link 'automated monitoring' through electronic identification tags that are attached to the cattle. The walk over weighing system has been constructed to be placed around a water trough so to get to water the animals must cross over the set of scales. This technology uses 'sophisticated walk over weighing that processes their weight and records their electronic ID (Swain, 2014). The CRC-REP has also been developing a new drafting system to incorporate within the walk over weighing system, so when livestock meet the required weight they are automatically drafted into a separate yard. It is being designed so that livestock can be automatically managed without being handled so they do not become stressed and loose weight. It is also designed so when the livestock meet required weight they are drafted into a different pen and the truck comes and picks them up (Swain, 2014). Dave Swain's university and Agforce Central Queensland have arranged a partnership that will allow them to work together to develop and improve emerging technologies. The partnership was also arranged so that the emerging technologies can be supported to making direct relations with education and training activities (Swain, 2014). There is new development being discussed that researchers are developing a more advanced piece of technology that can track livestock all over the property, check their reproductive status, health and the production of livestock all from an iPhone, iPod or laptop (Swain, 2014).

KA3 Benefits of the new technology are explored in some depth

KA3 collaboration between various agencies is noted

The development of the walk over weighing and remote camera monitoring has been improving the farming business not just in the production of their livestock but also in saving money as well. Farmers are saving a lot of money by using the walk over weighing system and remote camera monitoring, as they are not spending money on handling costs and mustering costs. It was developed and brought into the sheep industry through the collaboration and communication between CSIRO and the Australian Sheep industry Co-operative Research Centre. The remote camera

KA3 Benefits of the new technology are explored in some depth

monitoring involved within the walk over weighing system comprises of **electronic ear tags**, so when the sheep or other livestock walk over the scales their **weight is recorded, health and body condition is downloaded on to a computer software**. This allows farmers to access the results from the electronic ear tag and the scales from their computers without having to 'physically handle the sheep' to prevent stressing them out (Farming Ahead, 2004). The SHE concept development relates to the topic (walk over weighing and remote camera monitoring) because there is lots of scientific theories that provide a wide range of evidence from lots of sources, such as meat and livestock Australia, Dave Swain's university and Agforce Central Queensland, CSIRO, Will Wilson Central Queensland cattle producer and iHerd developer (iHerd – allows farmers to track livestock and monitor livestock mobs) and many more. All these people and sources have all helped develop and improve the walk over weighing system and remote camera monitoring to suit all famers.

KA2
Agricultural
concepts
applied
generally
effectively

The application for the walk over weighing system and remote camera monitoring so far has helped famers reduce their costs, saving time and improving their livestock's performance (Harrington Systems Electronics, 2017). Rebecca Gunther the producer demonstration site coordinator says, "*the project has lead to remote management systems that are now commercially available being refined and further developed*" (Harrington Systems Electronics, 2017). Trials that have been undertaken with the walk over weighing and remote camera monitoring have proved that this emerging technology is saving cattle producers and other producers a lot of money. Within the cattle business a trial was undertaken by the Remote livestock management system (RLMS) discovered that by using this technology cattle **farmers would be saving up to \$68 per head annually** (Harrington Systems Electronics, 2017). Rebecca Gunther also states "*that if your agent rings wanting a **certain class of steer**, or the meatworks price gird is offering a premium price for a **particular weight range**, you can look at the WOW (walk over weighing) data and **know quickly** whether you have cattle in that range*" (Harrington Systems Electronics, 2017).

KA3 Benefits
of the new
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some depth

The limitations for the walk over weighing and remote camera monitoring for the cattle industry is that they are still required to be drafted 'according to specifications' (Harrington Systems Electronics, 2017). To improve this limitation Precision Pastoral is developing a new technology to add to the walk over weighing and that is an auto-

draft. It is designed to separate the different livestock according to their weight. It will enable you to be able to change the settings to different weights for example if you want all cattle over 500kg you can change the settings to auto draft those cattle into different pens. It has also been designed to reduce the stress levels of animals, cause less bruising and less labour (Harrington Systems Electronics, 2017).

KA4 Some information is repeated many times

It is clear that the walk over weighing system and remote camera monitoring is an emerging technology that is improving the way that things are done within the farming industry. It is further being developed to improve the systems to make them more advanced, reduce costs and improve livestock production.

KA4 Communication is generally effective

Overall B standard for Stage 1

Reference List:

Using walk over weighing and remote camera monitoring to identify key management triggers and reduce costs, viewed 20 November 2017,

<https://futurebeef.com.au/projects/walk-over-weighing/>

Technology is changing the face of northern Australia cattle farming, viewed 21 November 2017,

<http://theconversation.com/technology-is-changing-the-face-of-northern-australian-cattle-farming>

Remote animal monitoring offers big benefits – Farming Ahead, viewed 22 November 2017,

www.farmingahead.com.au/wp-content/uploads/2016/10/

Remote control technologies to revolutionise farm life / Harrington, viewed 24 November 2017,

www.harringtonsystems.com.au/remote-control-technologies-to-revolutionise-farm-life