



Science Rocks
Career Expo 2020
ONLINE
STUDY GUIDE



agronomy
environmental science
science communication

Great Southern Science Council Pro Files series – connecting science professionals and our community

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Pro File video interview Watch the Pro File video *Andrew Storrie - Agronomists are great problem-solvers beyond agriculture* to learn more about this STEM professional, why they chose to work in this field and their pathway to it, their typical work day, favourite part of the job, common myths about their field, and more.



As an agronomist I also train growers and other agronomists in skills such as early weed identification. It is much easier to identify a weed when it is flowering, but for a farmer this is usually too late as seeds will be formed and go back into the seed soil bank.



Technology coming to agriculture. Here is a new machine vision + artificial intelligence system which is able identify and spray green weeds in a green crop. This means less pesticide in the environment, better weed control and potentially higher crop yields.



One of the great things about being an agronomist is getting out into nature

EXTENSION MATERIAL – science professionals answered these questions to extend your interest and study in their topic area

FREQUENTLY ASKED QUESTIONS in this topic/job	FAQ 1 How do I control weed X in situation Y?	Firstly you need to correctly identify the weed or weeds in question. Most people only know plants by common name. The trouble is common names vary with locality. For example, many WA farmers call any grass that burns well kerosene grass, so this could be at least half a dozen different species. If you don't have the plant in your hot little hands ID can be difficult. Descriptions over the phone are notoriously difficult, so clear photos or specimens in-hand are especially important. Next step is to figure out what sort of manager the person asking the question is. That person's skills and goals are particularly important to the advice I deliver.
	FAQ 2 What weed is this?	Like the first question, correct identification is important. There are a range of resources from excellent books to web sites and Facebook pages. A word of warning, you need to figure out the skill level of the people offering advice before you take their ID as accurate. Luckily I have been around a fair while so have lots of excellent contacts. I also know enough to know when I don't know something. Admitting you don't know is an important skill to develop. Just be willing to do the hard work to find out that the CORRECT answer is. Most people will appreciate this, rather than be given a quick but wrong answer.
	FAQ 3 What is an agronomist?	I'm often cheeky and tell people that I look at the stars (which is what astronomers do). While it's true I like looking at stars, it isn't what an agronomist does. Agronomists work in agriculture focussing on crops and pastures and how to get the most out of them. It is a wide field and you can be a research agronomist, an adult education (extension) agronomist or a mix of both which is what I am. Most of the research I have conducted can be directly used by farmers and companies. This is called "applied" research. In my career I eventually specialised in weed management and pesticides. Other agronomists specialise in plant nutrition, soils, plant breeding, plant physiology etc., so there is a wide range of careers available in agronomy.
YOUR TURN	What question could you ask this person?	

LEARN MORE	Andrew recommends ensuring you understand your information sources: Andrew says these websites have excellent resources about this topic:	These days a lot of information is on the web, so I rely on a lot of web-based material now. Atlas of living Australia https://www.ala.org.au/ Plantnet – NSW Flora on-line http://plantnet.rbgsyd.nsw.gov.au/search/simple.htm Weeds of Western Australia Facebook page - https://www.facebook.com/groups/WeedsofWesternAustralia/
DO MORE	A citizen science or interactive project that community can be involved in to learn more about this topic	Weeds of Western Australia Facebook page - https://www.facebook.com/groups/WeedsofWesternAustralia/ When using this site (or any social media!) take care and only listen to certain people who know their subject. Many commenters don't!!
INNOVATE One, Two, Three...solved!	One Big Problem we are trying to understand in this topic area Two innovative ways we are already trying to solve the problem THREE ideas for the problem solving wish-list that anyone could help develop	1 Development of herbicide resistance in weeds. 2.1 A lot of work is going into educating farmers on how resistance develops so they can then understand what they need to do to either prevent it developing or how to live with it. 2.2 A lot of research is underway to develop new herbicides as well as non-herbicide techniques to manage weeds including robots and machine learning. 3.1 Make machine vision and machine learning commercially viable within weed management 3.2 Improve the range of crops available to manage weeds through competition – such as allelopathy and have a profitable market. If the crop is not profitable it won't be grown. 3.3 Develop small cheap weed management systems that improve weed control in poorer countries without causing unemployment.
YOUR TURN	Using your new insights for this topic and its issues, please add another idea for the Problem Solving Wishlist. Then think of a research question to test possible solutions. <i>e.g. Idea: brainstorm a robot that can both distinguish an object and move it in one efficient pass of a target search area. Questions: what systems will your robot need?</i>	

<p># CURRICULUM LINKS #</p>	<p># investigating how scientific and technological advances have been applied to minimising pollution from industry #</p> <p>Agriculture typically uses fertilisers, which are great at making plants grow bigger and more quickly, but they can also pollute waterways. Do some research to investigate what methods have been used in Australia and other countries to minimise nitrogen and phosphate pollution from fertilisers.</p>
<p>INFLUENTIAL PEOPLE IN AGRICULTURE</p>	<p>Farmers and everyone working in the agriculture industry are influential worldwide. Did you know that agriculture is the biggest employer in the world? Globally, the percentage of people who work in agriculture is as high as 40%. In Australia, the percentage is only 2.5%. Research and discuss three factors that contribute to this big difference in Australia.</p>
<p>KNOWLEDGE + IMAGINATION What would it be like?</p>	<p>Where would we be without agriculture? There are modern hunter-gatherer societies, who do not use agriculture to produce most of their food. Do some research to find an example of such a culture and make a list of the differences and similarities between Australian society and that of hunter-gatherers.</p>
<p>OUR PATCH AGRICULTURE IN WESTERN AUSTRALIA</p>	<p>For the last few years in south west Western Australia, especially east of Albany in the grain-growing agricultural area known as the wheatbelt, meteorologists have measured consistently lower seasonal rainfall than in previous years (search climate data online at www.bom.gov.au).</p> <p>How do you think agriculture will change to cope with a dryer and warmer climate? What skills will agronomists need to learn to help feed the world's population in the future? How will this relate to Western Australia?</p>