Agricultural Technology: Exploring the New Frontier

TEACHER GUIDE

YEAR 9-10

SFIRP

STORM & FLOOD INDUSTRY RECOVERY PROGRAM

Contents

NB: Please double click throughout document on underlined text to go directly to website link and/or page.

PIEFA'S SFIRP program is funded by the Australian and NSW Government's Storm and Flood Industry Recovery Program

SURVEY LINKS TEACHERS, CAREER ADVISORS AND STUDENTS

- Select the teachers and career advisors **webink** to complete the survey or use the QR link.

- Select the students **webink** to complete the survey or use the QR link.

Your response to the survey questions will be used to continuously improve PIEFA's food and fibre education resources. Your contributions to this endeavour are greatly appreciated.

Primary Industries Education Foundation Australia

www.primezone.edu.au
primezone
The place for all your food and fibre resources

SFIRP
STORM & FLOOD INDUSTRY RECOVERY PROGRAM

LEARNING AREAS

NSW CURRICULUM CONTENT

YEAR 9 - Sustainable Biomes
- GE5-3 analyses the effect of interactions and connections between people, places and environments
- GE5-5 assesses management strategies for places and environments for their sustainability
- GE5-7 acquires and processes geographical information by selecting and using appropriate and relevant geographical tools for inquiry

STAGE 5 - Agricultural Technology
- AG5-8 evaluates the impact of past and current agricultural practices on agricultural sustainability
- AG5-9 evaluates management practices in terms of profitability, technology, sustainability, social issues and ethics
- AG5-12 collects and analyses agricultural data and communicates results using a range of technologies

AUSTRALIAN CURRICULUM CONTENT

YEAR 9 GEOGRAPHY
Biomes and food security

AC9HG9S03 Evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationships.

YEAR 10 GEOGRAPHY
Environmental change and management

AC9HG10S03 Evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationships.

YEAR 9 - 10 DESIGN AND TECHNOLOGIES
Food and fibre production

AC9TDE10K04 Analyse and make judgements on the ethical, secure and sustainable production and marketing of food and fibre enterprises.

YEAR 9 - 10 DIGITAL TECHNOLOGIES
Acquiring, managing and analysing data

AC9TDI10P02 Analyse and visualise data interactively using a range of software, including spreadsheets and databases, to draw conclusions and make predictions by identifying trends and outliers.

Agricultural technology - exploring the new frontier

Lesson objective

The Australian food and fibre industry offers endless opportunities for students to build a life and career that is dynamic, rewarding and constantly evolving. With the advances in technology and artificial intelligence, students have a number of options to explore a diverse and challenging range of careers. Visit Careers In Agriculture | Ag Careers | Australia - Career Harvest for more information.

Throughout the lessons, students will be exposed to past farming practices and how the evolution of technology can help resolve the many issues and challenges producers face. Students will explore the application of technology (online mapping tool from Datafarming) to help mitigate and/or alleviate some of the problems. Students will build their vocabulary and share existing knowledge and ideas about agriculture and the future of farming in the digital age. Students will then explore the plethora of job opportunities within the Australian food and fibre landscape.

Lesson overview (2 x 1 hour lessons)

ACTIVITY 1 - The History of Agriculture and the Evolution of Technology (40min)
ACTIVITY 2 - Introducing Datafarming Online Mapping Tool (40min - layover to Activity 3)
ACTIVITY 3 - Case Studies Careers in Agriculture Technology (40min)
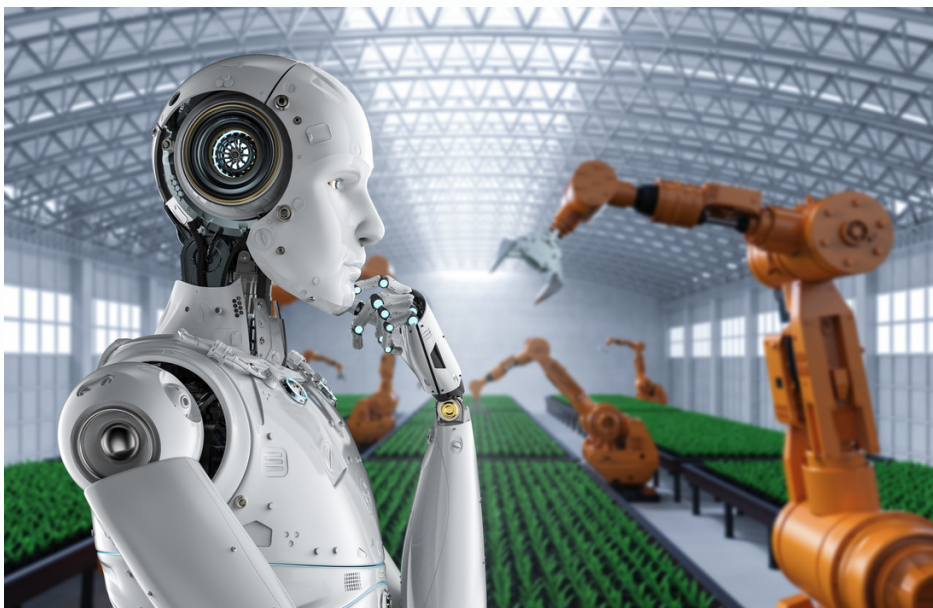
Stage 4 and 5

Agricultural technology - exploring the new frontier

Resources and equipment

ACTIVITY 1
1. Worksheet 1a: Where does our food come from?
2. Growing the Future - YouTube (4m23s)
3. Worksheet 1b: Challenges to farming and Worksheet 1c The challenges farmers face
4. The Agtech Revolution: Ep1_Digital Ag, Farmings New Frontier on Vimeo (20m44s)

ACTIVITY 2
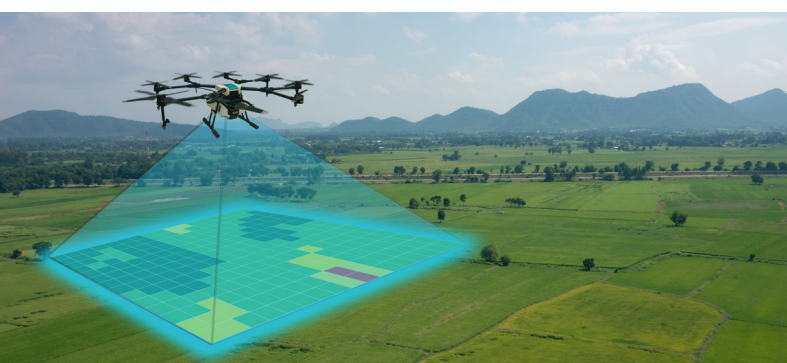1. Free farm map with NDVI, precision agriculture (datafarming.com.au)
2. Worksheet 2: Mapping NDVI health.
3. Worksheet 2: EXTENSION Variable rate spreading application

ACTIVITY 3
1. Worksheet 3a: Farmer Time case studies.
2. Farmer Time - Experts in the Field, Exploring Drone Technology.
3. Creating Resilience Through Empowering School Curriculums About Primary Industries Careers - YouTube (6m41s)
4. Worksheet 3b: Agriculture technology career pathways.

Teachers, please ask your IT department to unblock the YouTube video prior to delivering this lesson.

Primary Industries Education Foundation Australia

www.primezone.edu.au
primezone
The place for all your food and fibre resources

SFIRP
STORM & FLOOD INDUSTRY
RECOVERY PROGRAM

3

Stage 4 and 5

Lesson guide

Activity 1: History of agriculture and the evolution of technology (40min)

Students will learn about the history of Australian agriculture and the emergence of technology.

1. Facilitate a class discussion about current farming practices. Provide students with a copy or online access to **Worksheet 1a: Where does our food come from?** Encourage students to complete the simple worksheet whilst brainstorming the farming process.

2. Distribute one sticky note to each student.

3. Ask students to watch **Growing the Future - YouTube (4m23s)** which provides an overview of the history of agriculture in Australia from CSIRO.

4. Have students record one challenge farmers face on their sticky note. For example, access to fresh water, variable climate patterns, security. Have students place their response on a wall in the classroom for future reference. Provide students with a copy or online access to **Worksheet 1b: Challenges to farming** and **Worksheet 1c: The challenges farmers face** to complete.

5. Encourage students to consider how technology can help alleviate the identified challenges. Allow students to share their ideas about the many issues facing farmers today.

6. Watch the video **The Agtech Revolution: Ep1_Digital Ag, Farmings New Frontier on Vimeo (20m44s)**. At the conclusion of the video, discuss with your students the emergence of agricultural technology and how its development is helping our farmers today.

7. Re-visit the sticky notes wall describing farm challenges, and remove those that can be mitigated by agricultural technology - which challenges remain? Can you develop a new technology that can alleviate this?

Stage 4 and 5

Lesson guide

Activity 2: Introducing DataFarming online mapping tool (40min)

> *Students will learn about precision agriculture and the benefits of online applications or software data available to map farms to inform vegetation health (NDVI) and other pertinent metrics for farm management. Students will understand the importance of validating online data with site visits to confirm the value and outputs of digital tools.*

1. Access the ***DataFarming website*** and explain to students that DataFarming* is an easy to use, low cost platform to help deliver smarter farming solutions. Provide students with a copy of or online access to ***Worksheet 2a: Mapping NDVI Health.***

NB: Access Introduction to DataFarming - YouTube **(2min15sec) if you would like to learn the fundamentals of this online mapping tool.**

2. After electronically mapping a property, students will need to validate the data with a site inspection or employing drone technology. If the opportunity to **ground truth** the online data is available to your school, please proceed with this activity.

EXTENSION: DataFarming has numerous online mapping tools to inform farm management strategies. As an extension activity, have students explore the Variable Rate Spreading Application, which is split into the following 4 parts. Provide students with a copy or online access to ***Worksheet 2a: EXTENSION Variable Rate Spreading Application.*** Please note, step instructions for this activity have been kept minimal to challenge students in the use of online farming tools.

1. Collect data with agtech (drone technology)
2. Upload data / mapping information
3. Send data agronomy advice
4. Upload data to variable rate delivery (eg tractor spreader, sprayer, planter).

*Data Farming is an example of one of many commercial farming applications available within Australia.

Stage 4 and 5

Lesson guide

Activity 3: Case studies - careers in agriculture (40min)

Students will summarise their learning and develop an understanding of the diverse field and career pathways in the food and fibre industry relating to agricultural technology.

1. Ensure students have completed their mapping activity, and validated the data on site at your school.

2. Allocate students into working groups of 2-3 and provide them with **Worksheet 3a**: **Farmer Time Case Studies.** Groups select a Farmer Time video to investigate, watching the relevant video at **Farmer Time Weblink - Experts in the Field, Exploring Drone Technology.** Groups work together to analyse the farming technologies by carrying out a SWOT analysis and responding to the worksheet questions.

3. Watch the **Creating Resilience Through Empowering School Curriculums About Primary Industries Careers - YouTube (6m 41sec)** to understand some of the diverse job opportunities agricultural technology offers. Provide students with a printed copy or online access to **Worksheet 3b**: **Agriculture Technology Career Pathways.**

4. Task students to select a career they have learnt about from the previous lessons in agriculture. They need to determine how to make this role sound exciting by developing a promotional flyer. Students will use CANVA (or an alternative graphic design program to design preferable to your school) for their marketing campaign to promote their chosen career.

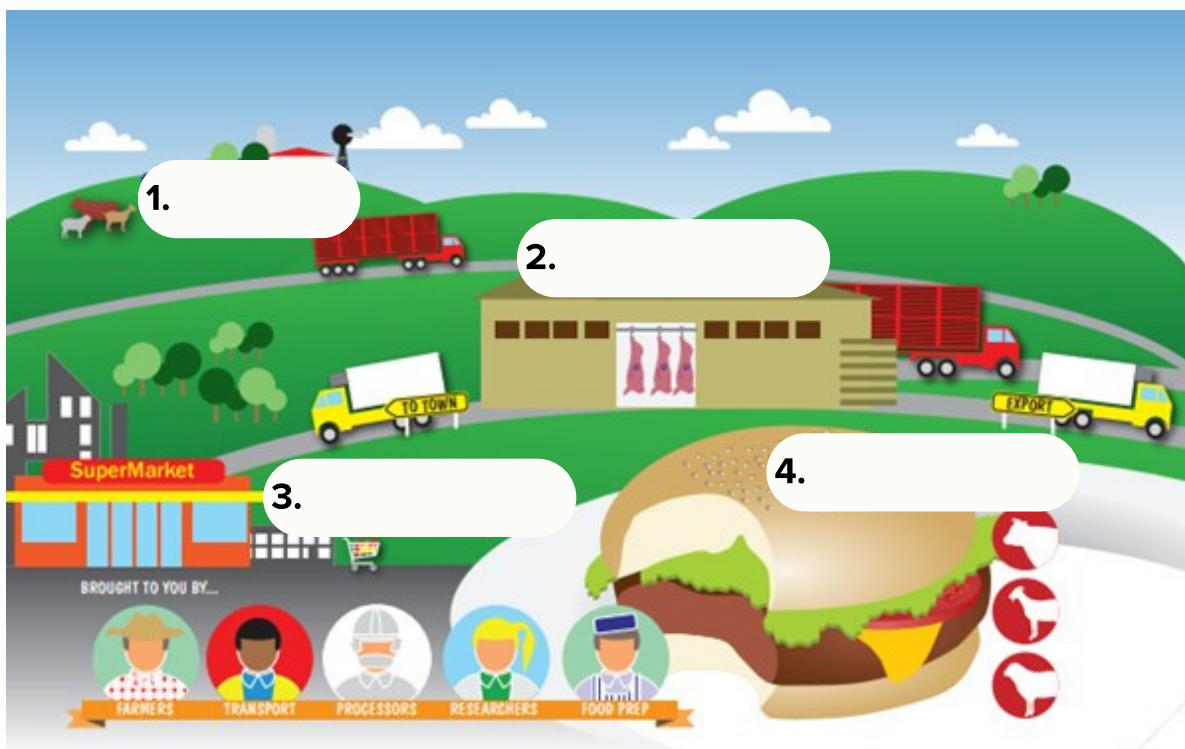5. Encourage students to present their flyer to the class to promote food and fibre careers.

Stage 4 and 5

WORKSHEET 1a

Agricultural technology - where does food come from?

Have you ever wondered where the food on your plate comes from? Brainstorm with your classmates using the discussion prompts and complete the simple paddock to plate schematic diagram below by filling in the squares with the appropriate step.

Farming	Discussion Points
Define farming	Where does your food and fibre come from? Where does it grow? How does your food and fibre get from the farm to you? What does a farmer do to produce food and fibre?
What issues can cause problems on a farm? What are the big expenses?	How do farmers get energy? What happens when there is not enough water? How do farmers know the soil and water quality and quantity?
What forms of technology and/or innovation options are available for farming?	Can you describe any forms of technology and/or innovation options available for farming? What are the advantages of this technology? What are the limitations of this technology?

STEPS

Ready to eat!

Preparation

Farm

Processing Plant

WORKSHEET 1b

Agricultural technology - challenges to farming

Farm challenges are issues or problems that impact daily operations.
Farming activities are labour intensive, time consuming, repetitive, sometimes dangerous and can be hot, wet and/or dirty at times. Match the terms below with the correct icon.
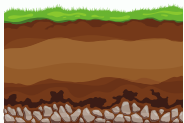
	● ●	Fresh water access
	● ●	Livestock tracking
	● ●	Distances required to travel on site and to a range of markets
	● ●	Variable weather patterns and climate change
	● ●	Soil health
	● ●	Pests / weeds / diseases
	● ●	Productivity quality and yields
	● ●	Animal welfare
	● ●	Environmental concerns / biodiversity

Primary Industries Education Foundation Australia

www.primezone.edu.au
primezone
The place for all your food and fibre resources

SFIRP
STORM & FLOOD INDUSTRY
RECOVERY PROGRAM

Stage 4 and 5

WORKSHEET 1c

Agricultural technology - the challenges farmers face

1. In the table below, describe the impact challenges have on farm management, as well as the producer's personal life. Think about the time consuming effort put into the operations of a working farm and the effects of variable weather patterns in your response. In the space below, provide an evaluation as to why past practices were unsustainable and why current or future practices need to be more efficient for each challenge.

Challenge	Impact to the producer / farm management
Fresh water access	
Livestock tracking	
Distances required to travel on site and to a range of markets	
Variable weather patterns and climate change	
Soil health	
Pests / weeds / diseases	
Productivity quality and yields	
Animal welfare	
Environmental concerns / biodiversity	

Primary Industries Education Foundation Australia

www.primezone.edu.au
primezone
The place for all your food and fibre resources

SFIRP
STORM & FLOOD INDUSTRY
RECOVERY PROGRAM

Stage 4 and 5

WORKSHEET 2

Agricultural technology - mapping NDVI health

This activity will help you to develop skills in online digital mapping. The tool you will employ is called DataFarming, and is an easy to use, low cost platform to help deliver smarter farming solutions. Access Free farm map with NDVI, Precision agriculture (datafarming.com.au) and follow the directions to learn how you can understand the vegetation health of your school grounds!

NB: To learn how to create a farm and view NDVI watch the video Accessing NDVI images on the DataFarming platform
1. Select the 'Start for Free Here' tab.

2. Populate the fields with your information and select login.
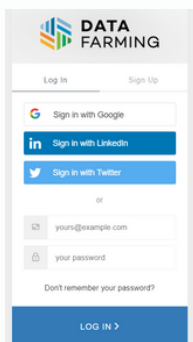
3. Go to the 'Farms' tab on the dashboard and select the 'Create Farm' icon. Name your school farm. Select "draw on map".
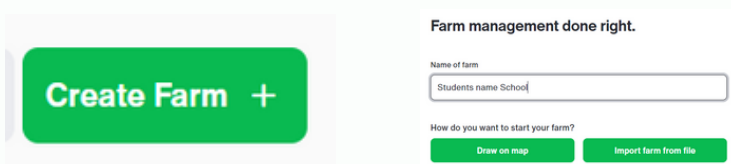
4. Go to the 'Search' icon on the top right hand of your screen. Populate the field with your school address and press Enter or manually find your school farm on the satellite map.
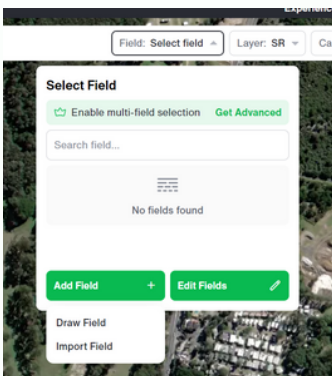
WORKSHEET 2

Agricultural technology - mapping NDVI health

5. The aerial view of your school farm will appear on your screen. Select the arrow next to your name in the top left corner. To the right of the screen, select the 3 dots circled and to 'View Tutorial'. Hover over the fields and icons to learn what each does.
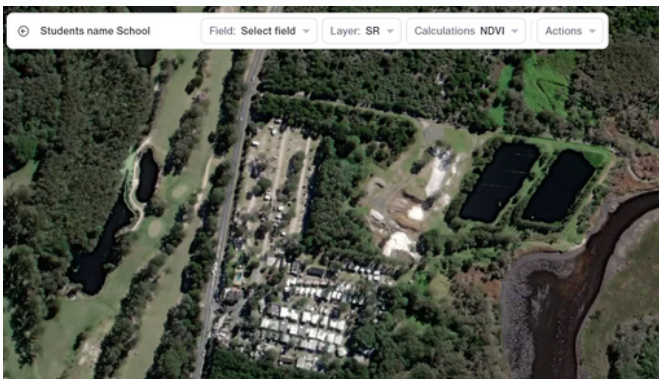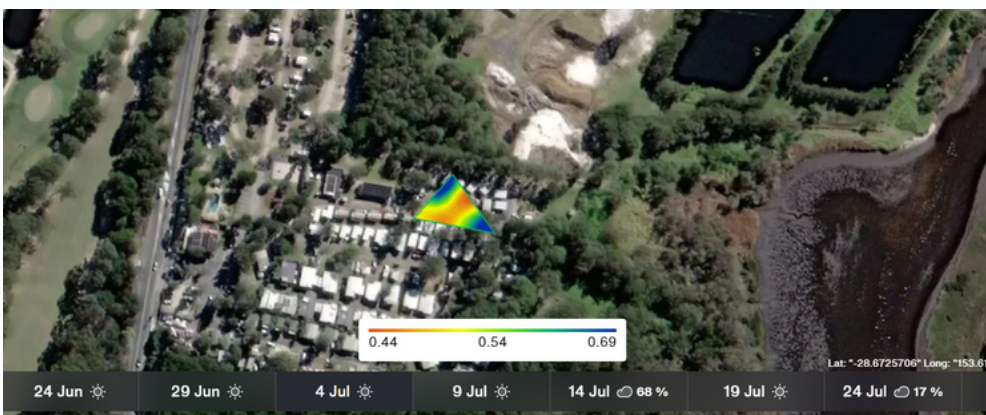

6. Select the 'Field' icon, 'Add Field' and 'Draw Field' with an appropriate name e.g. vegetable cropping, pasture grazing. Draw a polygon object and make sure to 'close' the object. Take note of "error" which can be obtained by including a shed or concrete structure within a grazing field. **Ground truthing** will account for these errors before farm decision making occurs. 'Save' your field. Create other fields to identify the different components of your school farm.

7. Use the mouse cursor to select a field of your school to investigate the soil health (NDVI). Select a field, e.g. vegetable plot, and select a date in the bottom of the page that has no cloud cover, as clouds create error.

Stage 4 and 5

WORKSHEET 2

Agricultural technology - mapping NDVI health

8. Now that you have the NDVI object mapped, observe the thematic pattern against the legend below. What does your pattern indicate?
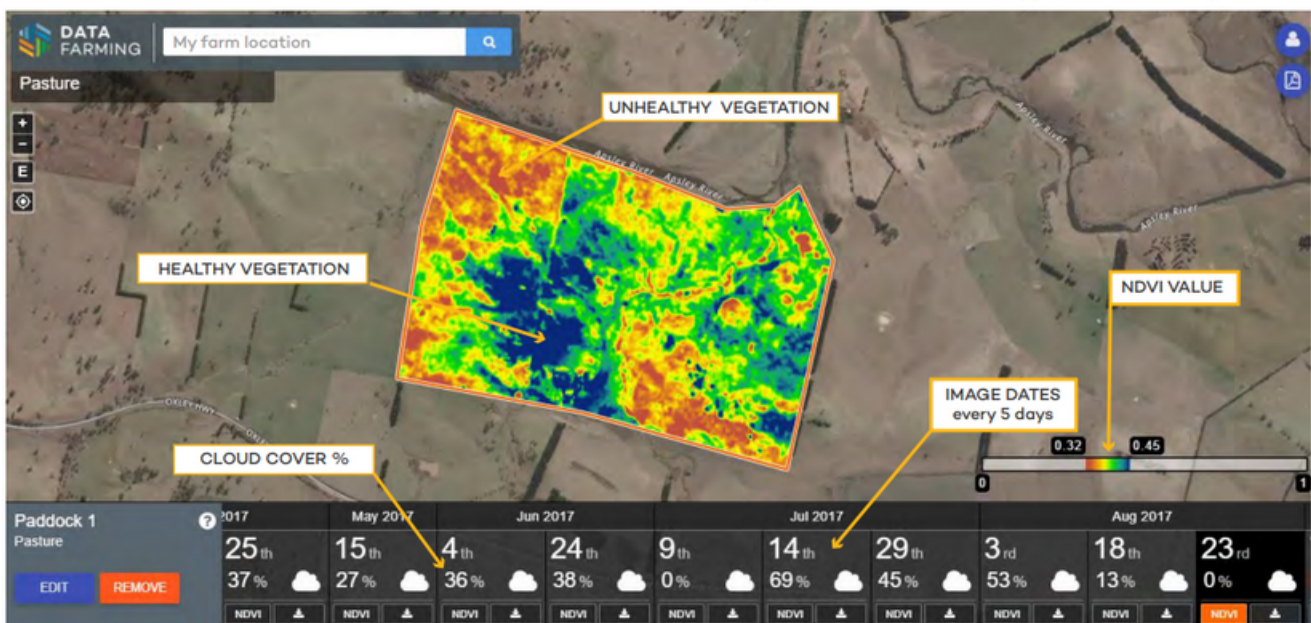
_____

_____

_____

9. Once you have electronically mapped the NDVI of the selected field in your school, you will need to validate the data with a site inspection called **ground truthing**. Proceed to the site and take pictures of the ground cover in each of the different coloured zones. Conduct a soil test in each zone using page 8 of the <u>DPI Northern Rivers Soil Health Card</u> (3 tests in each zone will ensure reliable data using an average). Respond to the questions on the next page.

Stage 4 and 5

WORKSHEET 2

Agricultural technology - mapping NDVI health

Imagine you are a farmer trying to determine the best location to plant your shade trees for livestock shelter. You have employed the DataFarming tool to understand the health of your soil and now will use this information to inform where best to plant the tree seedlings. On the image below, respond to the following by drawing on the image:

- Where would you place a soil probe to validate the DataFarming thematic map? Why?
- If the soil probe confirms the DataFarming information, where would you plant your trees?
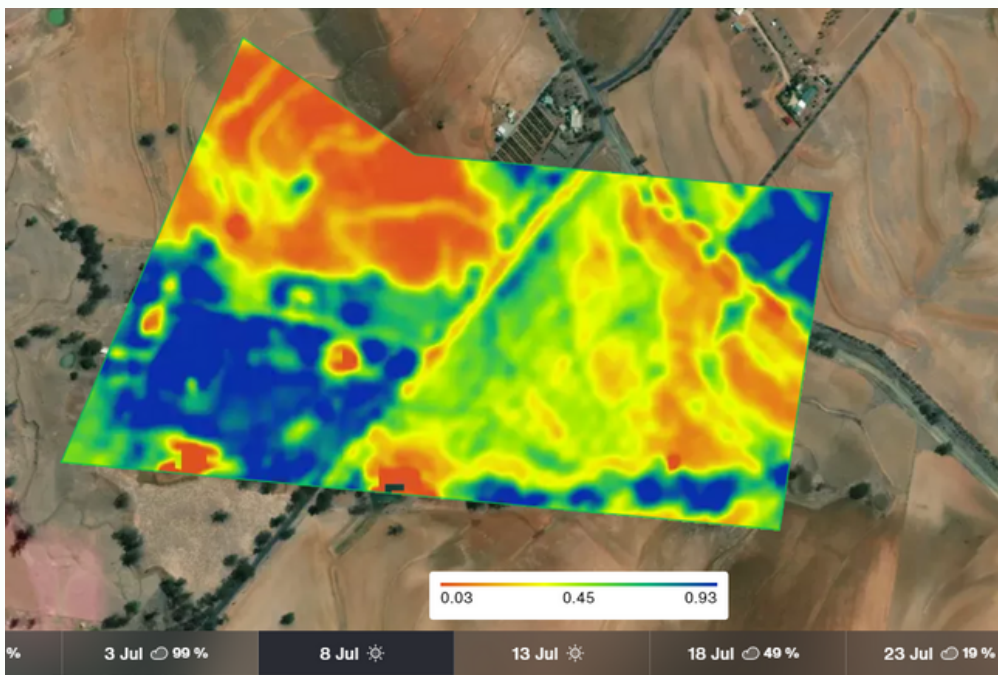
10. What are the advantages and disadvantages of the DataFarming Tool as an Agtech application?
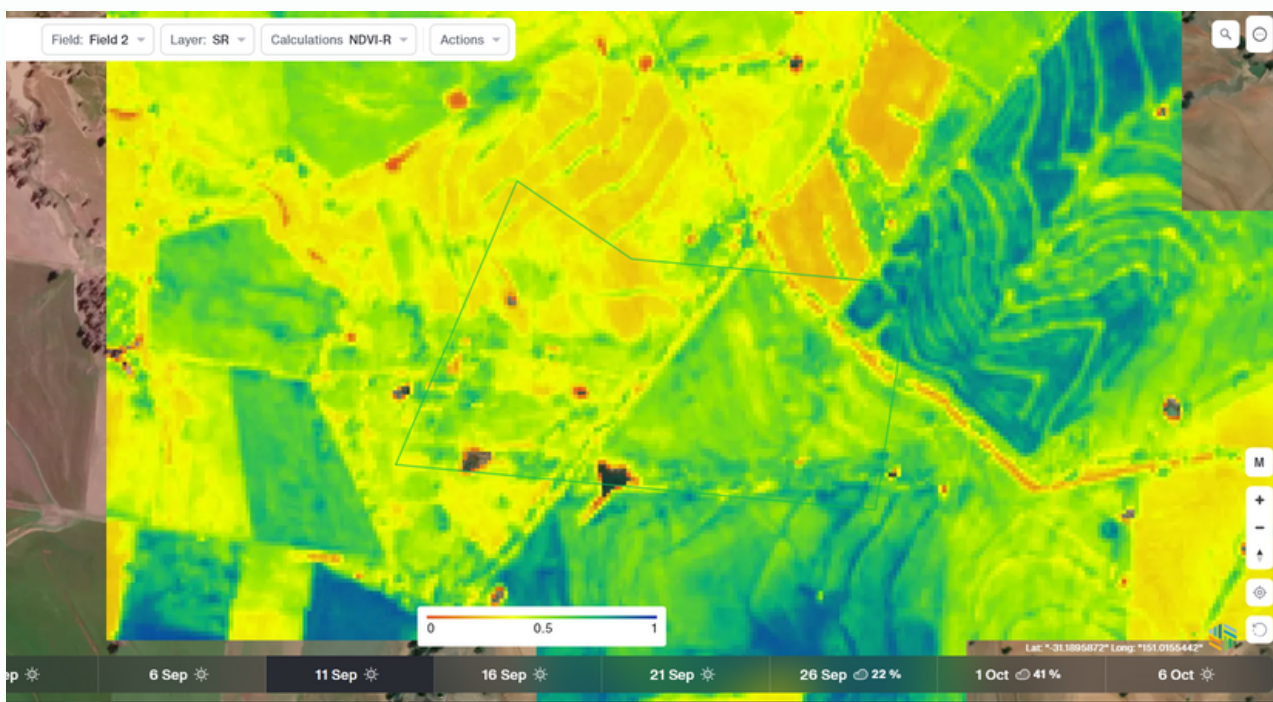
_____

_____

_____

11. Evaluate the tool in providing evidence and support in driving effective farm management as part of a holistic decision support system? Examples to consider - chemical, fertiliser or seed application rates or land use.

_____

_____

_____

Stage 4 and 5

WORKSHEET 2

Agricultural technology - mapping NDVI health

Select the **Northern Rivers Soil Health Card** to help you respond to the following questions.

12. Compare the online data to your site visit and soil tests.

Identify the similarities between zones e.g. same pasture species**:**

_____

_____

_____

_____

_____

_____

_____

_____

Identify the differences between zones e.g. slope/gradient, groundcover etc.

_____

_____

_____

_____

_____

_____

_____

_____

_____

EXTENSION: Variable rate spread application

1. Select paddock / select layer.
2. Under variable rate, select zones/select Actions-create zones/select a date with no cloud cover/view image.
3. Identify the appropriate number of zones based on your ground truthing knowledge.
4. Select a resolution to provide accuracy.
5. Explore different resolutions and results.
6. Provide an application rate to use (please use PIEFA seed pack information).
7. Provide a different rate for each zone e.g. for seeds, use a higher rate where there is less ground cover to help establish good overall cropping cover. When you select 'add to cart,' make sure to **not** proceed with payment.

NB: The step instructions for this extension activity have purposefully been kept minimal to challenge students using online farming tools.

Stage 4 and 5

WORKSHEET 3a

Agricultural technology - Farmer Time
case studies

1. Access <u>PIEFA's Farmer Time | Experts in the Field - Exploring Drones in Agriculture</u> and select one Farmer Time video for your group to investigate. Which episode did you choose to watch?

_____

_____

_____

_____

2. Complete the SWOT analysis on drone technologies after watching the Farmer Time video. A SWOT analysis is undertaken to identify strengths and weaknesses, as well as external opportunities and threats of agricultural technology.

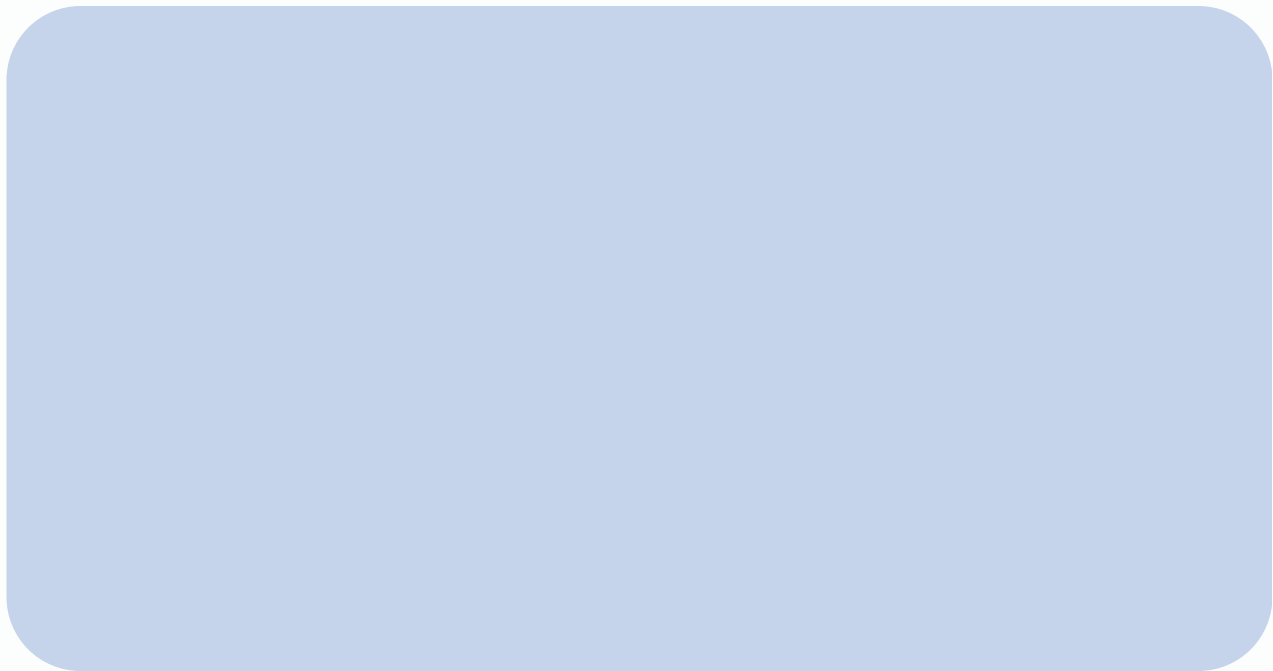| **S** Strengths ✔	**W** ✔ Weaknesses
O Opportunities ✔	**T** ✔ Threats

SWOT

Stage 4 and 5

WORKSHEET 3a

Agricultural technology - Farmer Time
case studies

3. What types of technology have been discussed in the Farmer Time episode?

_____

_____

_____

4 Pick one form of technology that you observed and describe what aspect of farm operation you think it benefits. In your response, you can choose to draw an image that visually represents how the technology has a greater advantage over archaic farming techniques. Two examples include - drones accessing difficult areas of the farm compared to a foot inspection and tagging cows to monitor basal temperatures is easier than individually testing them.

5. Has technology made life easier for the producer? How? In your response describe the benefits and limitations of implementing the technology.

_____

_____

_____

_____

_____

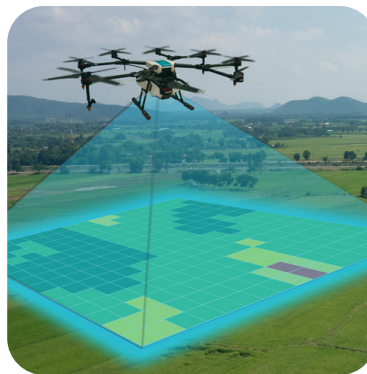WORKSHEET 3b

Agricultural technology - career pathways

You work at a very successful advertising firm in the city and have just landed a lucrative contract with the Australian Agricultural Careers Corporation. To deliver on this contract, you have to develop a campaign to promote careers in agricultural technology by creating a promotional flyer. Use the stimulus material below, as well as your own online research and what you have learnt in the last 2 lessons, to develop a CANVA (or other online design graphic program) promo flyer to attract Year 10, 11 and 12 students finishing high school to work in agricultural technology. If CANVA (or other online design graphic program) is not available to you, draw your advertisement flyer. Watch the ***Creating Resilience Through Empowering School Curriculums About Primary Industries Careers - YouTube (6m41s)*** and access ***Career Harvest*** to help with your work. Remember - you want students to see the '**WOW**' factor in agricultural technology careers - make sure your flyer delivers this outcome!!!

Global Food Security versus Population Growth

Employment Opportunities Galore!

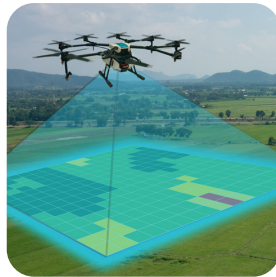**Global Issues - Climate Change, Resource Use, Biodiversity**

Nature Lover - Environmental, Sustainable, Ecological

WORKSHEET 3b

Agricultural technology - career pathways

Class presentations

Present your promotional flyer to your class.

Remember, you can use farm maps, diagrams and flow charts to enhance your career!

During each group's presentation, challenge students to find synergies with each of the careers spoken about.

Presentation format:

1. Group A, B, C ..... (2 minute presentation, with each student participating)
2. Class questions (1 minute for questions and comments)

Prompts for your presentation

- Introduce your group to the class.
- Describe your selected agricultural career.
- Describe the challenges your career will address.
- Why did you select this particular career?
- What is the overall impact associated with your career? Describe issues including farm productivity, yield, efficiencies, improvements to resource use (water, energy usage), climate change, food security.
- How will your career help producers from a social / environmental / economic perspective?
- Would you like a career in agricultural technology?

Stage 4 and 5

WORSHEET 1a ANSWERS

Agricultural technology - where does food come from?

Have you ever wondered where the food on your plate comes from? Brainstorm with your classmates using the discussion prompts and complete the simple paddock to plate schematic diagram below by filling in the squares with the appropriate step.

Farming	Discussion Points
Define farming	Where does your food and fibre come from? Where does it grow? How does your food and fibre get from the farm to you? What does a farmer do to produce food and fibre?
What issues can cause problems on a farm? What are the big expenses?	How do farmers get energy? What happens when there is not enough water? How do farmers know the soil and water quality and quantity?
What forms of technology and/ or innovation options are available for farming?	Can you describe any forms of technology and/or innovation options available for farming? What are the advantages of this technology? What are the limitations of this technology?

1. Farm

2. Processing Plant

3. Preparation

4. Ready to eat!

STEPS

Ready to eat!

Preparation

Farm

Processing Plant

Stage 4 and 5

WORKSHEET 1b ANSWERS

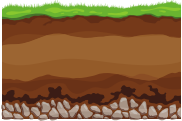# Agricultural technology - challenges to farming

Farm challenges are issues or problems that impact daily operations. Farming activities are labour intensive, time consuming, repetitive, sometimes dangerous and can be hot, wet and/or dirty at times. Match the terms below with the correct icon.

● ◄———————————► ●	Fresh water access
●	Livestock tracking
●	Distances required to travel on site and to a range of markets
●	Variable weather patterns and climate change
●	Soil health
●	Pests / weeds / diseases
●	Productivity quality and yields
●	Animal welfare
●	Environmental concerns / biodiversity

Stage 4 and 5

WORKSHEET 1c ANSWERS

Agricultural technology - the challenges farmers face

1. In the table below, describe the impact challenges have on farm management, as well as the producer's personal life. Think about the time consuming effort put into the operations of a working farm and the effects of variable weather patterns in your response. In the space below, provide an evaluation as to why past practices were unsustainable and why current or future practices need to be more efficient for each challenge.

Unsustainable farming occurs when present progress is at the expense of future generations. For example, irresponsible high water use and environmental degradation through exploitation of resources generates waste and pollution that damages ecosystems and receiving environments. Future practices need to be efficient in use resources, environmental sustainable and economically viable to produce food and fibre for a growing population.

Challenge	Impact to the producer/ farm management
Fresh water access	Water scarcity has a huge impact on food production, as farmers cannot water their crops (The Water Project, n.d).
Livestock tracking	Livestock tracking can improve farm productivity by monitoring animal health, as well as having GPS trackers for security.
Distances required to travel on site and to a range of markets	The operational requirements of farms on the people working can be time consuming and labour intensive, which can result in fatigue and adverse mental health impacts.
Variable weather patterns and climate change	Flooding and drought can reduce farm productivity; destroying crops, harvesting and animals.
Soil health	Soils provide important nutrients for crop growth, and the soil quality can help control plant diseases, insects and weeds, ultimately improving and enhancing crop production.
Pests / weeds / diseases	Pests, weeds and disease can damage crops, reduce food production, kill livestock and cause environmental degradation.
Productivity quality and yields	The quality and value of productivity yields ultimately impacts how lucrative the farm operations are. Good quality, high yields results in better economic outcomes for the farm.
Animal welfare	Well cared for animals are productive and improving animal welfare can enhance health, sustainability and yields for the farmer.
Environmental concerns / biodiversity	Greater biodiversity benefits agriculture through such effects as an increase in pollinators, the presence of species that reduce pests, and better soil quality (The challenge of feeding the world sustainably, n.d).

Stage 4 and 5

WORKSHEET 2 ANSWERS

Agricultural technology - mapping NDVI health

8. Now that you have the NDVI object mapped, observe the thematic pattern against the legend below. What does your pattern indicate?

Please see colour legend to interpret results.

9. Once you have electronically mapped the NDVI of the selected field in your school, you will need to validate the data with a site inspection called **ground truthing**. Proceed to the site and take pictures of the ground cover in each of the different coloured zones. Conduct a soil test in each zone using page 8 of the DPI Northern Rivers Soil Health Card (3 tests in each zone will ensure reliable data using an average). Respond to the questions on the next page.

Stage 4 and 5

WORSHEET 2 ANSWERS

Agricultural technology - mapping NDVI health

Imagine you are a farmer trying to determine the best location to plant your trees. You have employed the Data Farming tool to understand the health of your soil and now will use this information to inform where best to plant the tree seedlings. On the image below, respond to the following by drawing on the image:

- Where would you place a soil probe to validate the DataFarming Thematic map? Why?
- If the soil probe confirms the DataFarming information, where would you plant your tress?
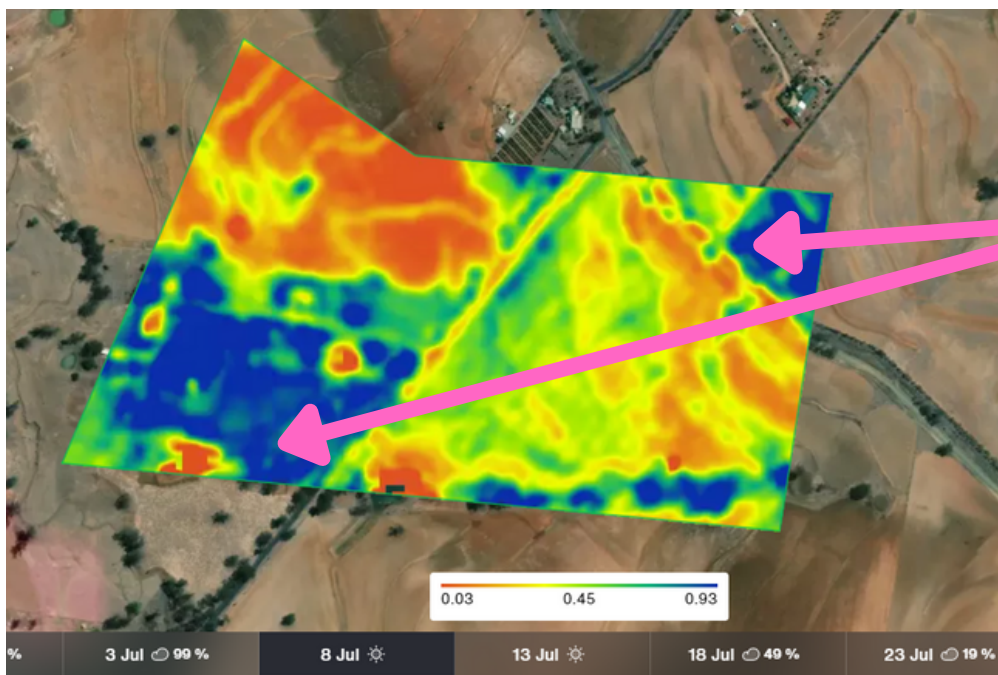
SOIL PROBE PLACEMENT

To confirm the soil health, place the soil probe in the areas with the blue colour. If the soil probe validates the DataFarming value, then plant your crop in the blue areas.

10. What are the advantages and disadvantages of the DataFarming Tool as an Agtech application?

DataFarming imagery access provides digital solutions for agricultural issues. The advantages are the free, simple, automated and easily accessible data available to farmers to help understand vegetation health, soil and other parameters. Disadvantages include the level of accuracy of the acquired data that needs to be validated (however, as the tool becomes more sophisticated, this issues will be marginalised).

11. Evaluate the tool in providing evidence and support in driving effective farm management as part of a holistic decision support system? Examples to consider - chemical, fertiliser or seed application rates or land use.

Farming activities are labour intensive, time consuming, repetitive, sometimes dangerous and can be hot, wet and/or dirty at times. With increase access to online digital data becoming available via improvements in agricultural technology, the future of farming operations can become more sustainable. Digital technologies and improvements in data capture and storage allows farmers to make informed decisions about their operations, resulting in higher yields, better quality produce and more time for the farmer to enjoy life.

Stage 4 and 5

WORSHEET 2 ANSWERS

Agricultural technology - mapping NDVI health

25

Select the **Northern Rivers Soil Health Card** to help you respond to the following questions.

12. Compare the online data to your site visit and soil tests.

NB: No answers have been provided because of the variability in responses, please see examples next to the identify similarities and differences.

Identify the similarities between zones e.g. same pasture species:

_____

_____

_____

_____

_____

_____

_____

_____

Identify the differences between zones e.g. slope/gradient, groundcover etc.

_____

_____

_____
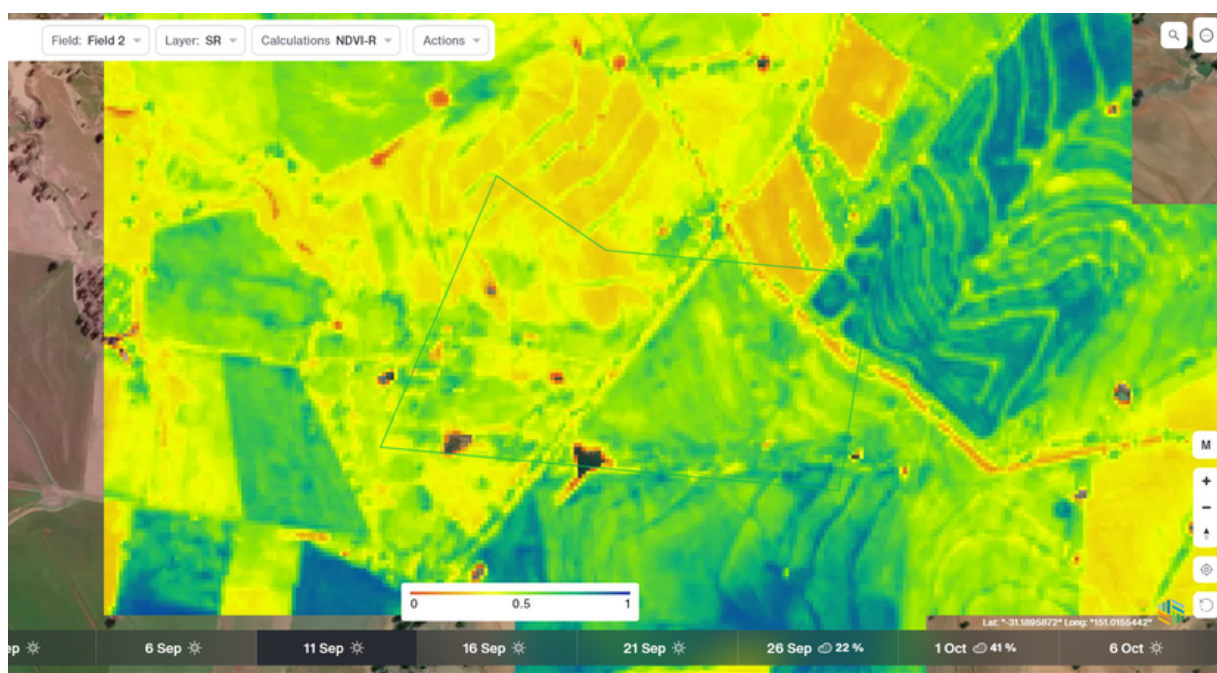
_____

_____

_____

_____

_____

Stage 4 and 5

EXTENSION: Variable rate spread application

1. Select paddock / select layer.
2. Under variable rate, select zones/select Actions-create zones/select a date with no cloud cover/view image.
3. Identify the appropriate number of zones based on your ground truthing knowledge.
4. Select a resolution to provide accuracy.
5. Explore different resolutions and results.
6. Provide an application rate to use (please use PIEFA seed pack information).
7. Provide a different rate for each zone e.g. for seeds, use a higher rate where there is less ground cover to help establish good overall cropping cover. When you select 'add to cart,' make sure to **not** proceed with payment.

NB: The step instructions for this extension activity have purposefully been kept minimal to challenge students using online farming tools.

NB: No answers have been provided because of the variability in responses.
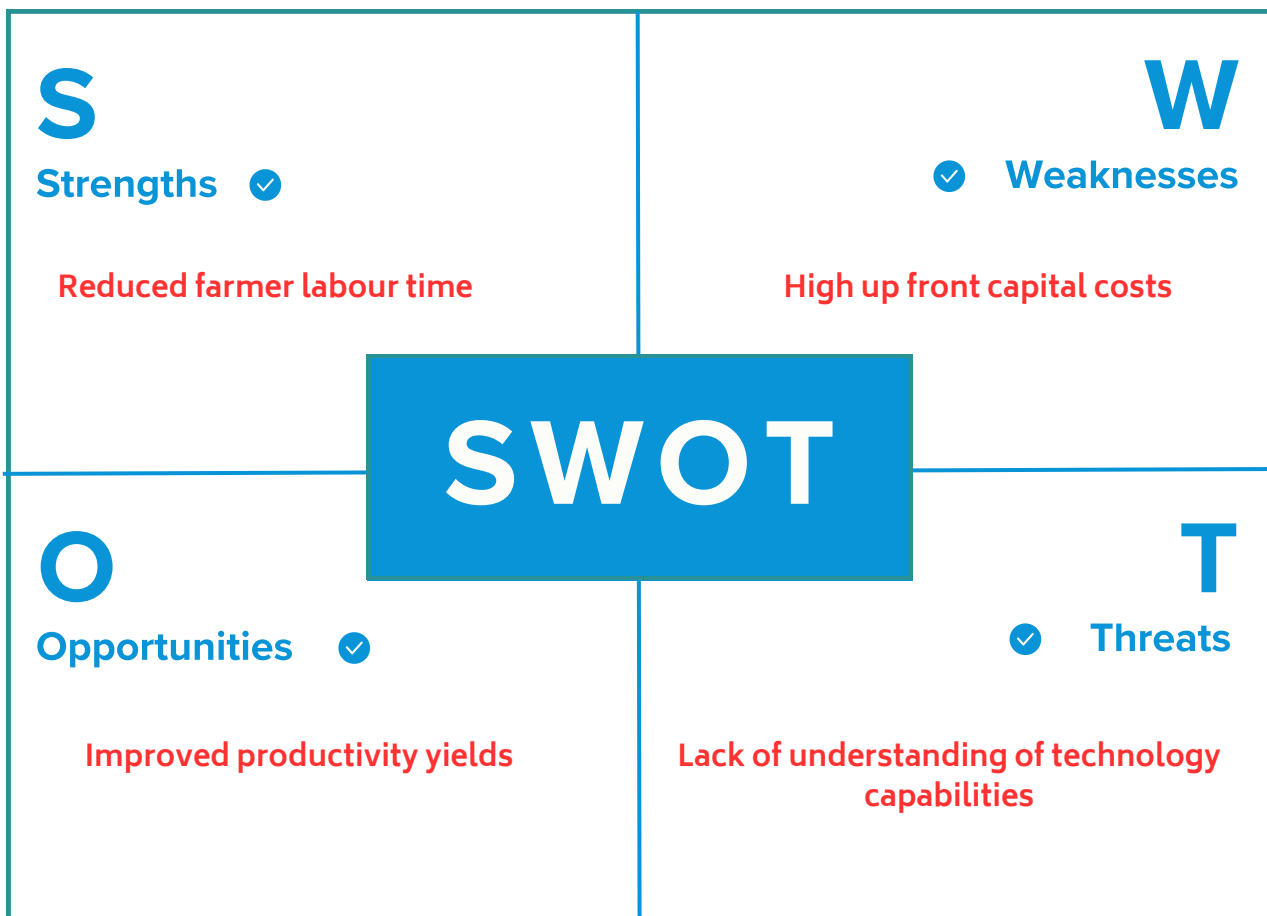
Stage 4 and 5

WORSHEET 3a ANSWERS

Agricultural technology - Farmer Time
case studies

1. Access <u>PIEFA's Farmer Time | Experts in the Field - Exploring Drones in Agriculture</u> and select one Farmer Time video for your group to investigate. Which episode did you choose to watch?

_____

_____

_____

_____

2. Complete the SWOT analysis on drone technologies after watching the Farmer Time video. A SWOT analysis is undertaken to identify strengths and weaknesses, as well as external opportunities and threats of agricultural technology.

NB: Answers will vary, generic / example responses shown below.

| **S** Strengths ✓	**W** ✓ Weaknesses
Reduced farmer labour time	High up front capital costs
SWOT	
O Opportunities ✓	**T** ✓ Threats
Improved productivity yields	Lack of understanding of technology capabilities

Stage 4 and 5

WORKSHEET 3a ANSWERS

Agricultural technology - Farmer Time
case studies

3. What types of technology have been discussed in the Farmer Time episode?

Drones, tagging, solar, robotic.

4 Pick one form of technology that you observed and describe what aspect of farm operation you think it benefits. In your response, you can choose to draw an image that visually represents how the technology has a greater advantage over archaic farming techniques. Two example include - drones accessing difficult areas of the farm compared to a foot inspection and tagging cows to monitor basal temperatures is easier than individually testing them.

Drones have the ability to survey a greater mass of land over a reduced amount of time and labour activity compared to a foot survey.
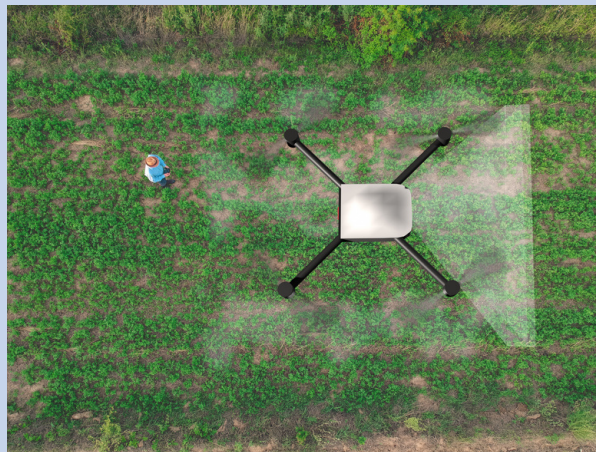
5. Has technology made life easier for the producer? How? In your response describe the benefits and limitations of implementing the technology.

The farmer has more time for other aspects of life. Technology can be more accurate in many areas of farming, allowing for informed decision making when considering different farm management techniques.

Primary Industries Education Foundation Australia

www.primezone.edu.au
The place for all your food and fibre resources

SFIRP
STORM & FLOOD INDUSTRY
RECOVERY PROGRAM

REFERENCES

Agricultural technology -
exploring the new frontier

- ACARA. (2022). Australian Curriculum, Assessment and Reporting Authority. Acara.edu.au. https://www.acara.edu.au/

- Career Harvest. (n.d). Career Harvest. Primary Industries Education Foundation Australia. https://www.careerharvest.com.au/

- CSIRO. (2017, February 9). *Growing the Future* [Video]. Youtube. https://www.youtube.com/watch?v=KGWZK6kq5mw

- Farmer Time | Experts In The Field – Exploring Drones in Agriculture. (2023). Primezone. Primary Industries Education Foundation Australia. https://primezone.edu.au/resource/farmer-time-experts-in-the-field/

- *DataFarming* (n.d). Retrieved 10 August, 2023, from https://www.datafarming.com.au/

- Lightbridge Productions. (2023, July 25). *The Agtech Revolution: Ep1_Digital Ag, Farmings New Frontier* [Video]. Vimeo. https://vimeo.com/848582036

- NSW Department of Primary Industries (2002). Northern Rivers Soil Health Card. https://www.dpi.nsw.gov.au/agriculture/soils/soil-testing-and-analysis/health-card

- PIEFA. (2023). Seed Pack. https://www.piefa.edu.au/wp-content/uploads/2023/05/Insectory-blended-seed-packs.pdf.

- The Water Project. (2019). The Water Project. The Water Project. https://thewaterproject.org/

Image Attributions:

CANVA image by Pramote Polyamate's Images, https://www.canva.com/photos/MAFG-LO5ME8-agriculture-drone-fly-farmers-fly-drones-to-spray-hormonal/
CANVA image by Jacquelinw Nix, https://www.canva.com/photos/MADmYSurH44-kentucky-horse-farm-landscape/
CANVA image by sommail, https://www.canva.com/photos/MADFNkCFJHo-planting-seed-in-soil/
Primezone Academy, From Paddock to Plate: The Essential Ingredient | Agriculture Lessons (primezone.edu.au) sourced 3 August 2023.
CANVA image by AndreyPopov, https://www.canva.com/photos/MAECAIoeEsQ-modern-smart-farming-agriculture-technology-at-farm/
CANVA image by lamyai, https://www.canva.com/photos/MADI0BPuAKU-growing-young-maize-seedling-in-cultivated-agricultural-farm-field-with-modern-technology-concepts/
CANVA image by bjdlzx, https://www.canva.com/photos/MAED4FgxhhU-career-path-ahead/
CANVA image by BigWest1, https://www.canva.com/photos/MAEFiqtAGYE-farm-tractor/
CANVA image by aerogondo, https://www.canva.com/photos/MADCiRSJa_A-drone-agriculture-spraying-of-crops/
CANVA image by Ekkasit919, https://www.canva.com/photos/MADeq8SdVCg-drone-for-agriculture-drone-use-for-various-fields-like-research-analysis-safety-rescue-terrain-scanning-technology-monitoring-soil-hydration-yield-problem-and-send-data-to-smart-farmer-on-tablet/
CANVA image by lamyai, https://www.canva.com/photos/MADI0BPuAKU-growing-young-maize-seedling-in-cultivated-agricultural-farm-field-with-modern-technology-concepts/
CANVA image by PhonlamaiPhoto's Image, https://www.canva.com/photos/MAExc7k5V7c-agriculture-technology-concept/
CANVA image by Nordroden, https://www.canva.com/photos/MADREYv-8aw-large-livestock-farm-evening-shooting-/