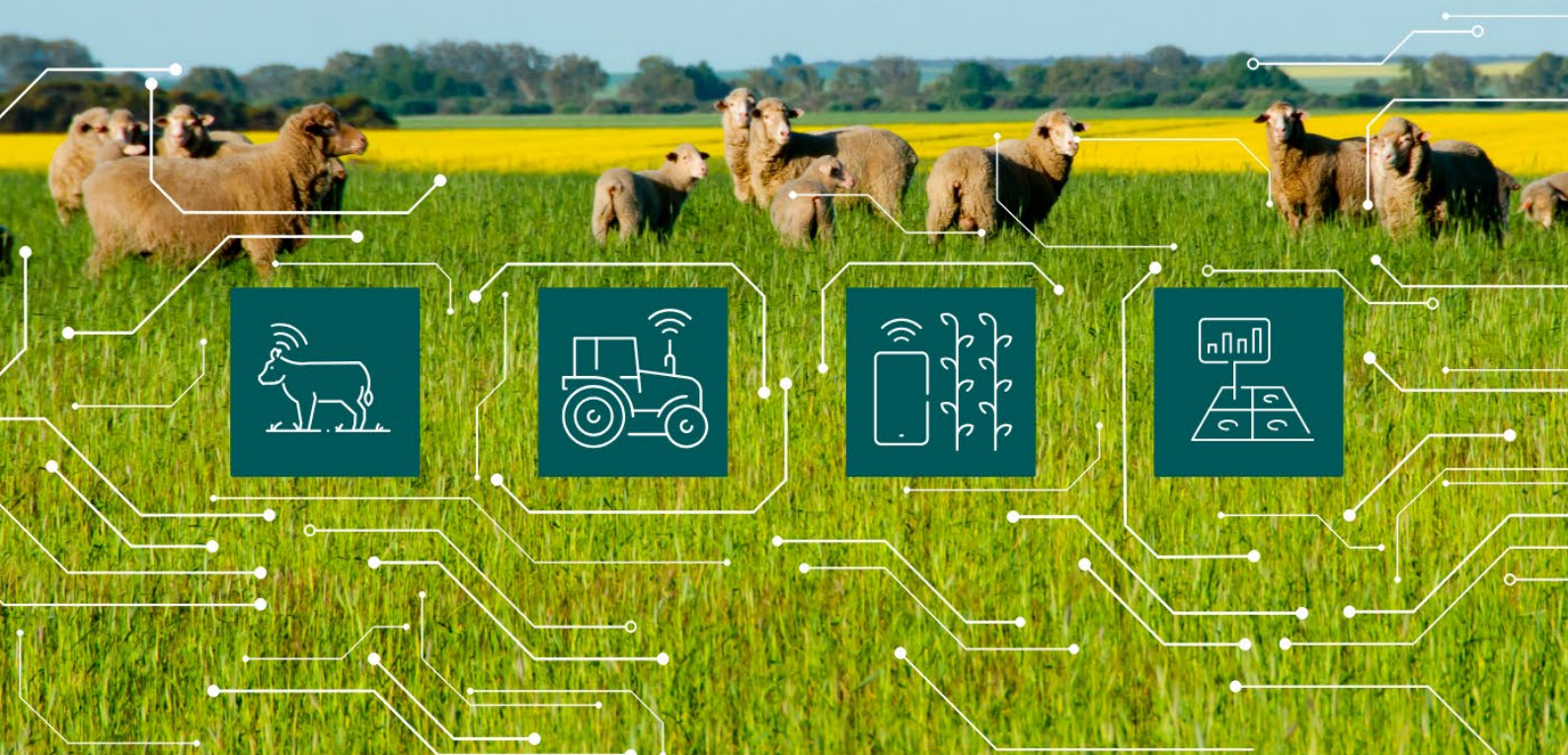


Agtech Fundamentals

Monitoring your farm with Agtech

Farms of the Future &
NSW PI Schools Program

Answer Guide



www.agtech.dpi.nsw.gov.au

Farms of the
FUTURE

Paddocks of Tomorrow,
Grounded in Technology



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Agtech Fundamentals- Monitoring your farm with Agtech

Sample answers have been provided for learning activities where applicable for this document. The following suggested answers should be used as a guide. It should be noted that these sample answers are suggested answers and not necessarily the very best answer, nor are they the only possible answers.

The accompanying resources are found at: [NSW Primary Industries School Programs, Agtech Fundamentals](#)

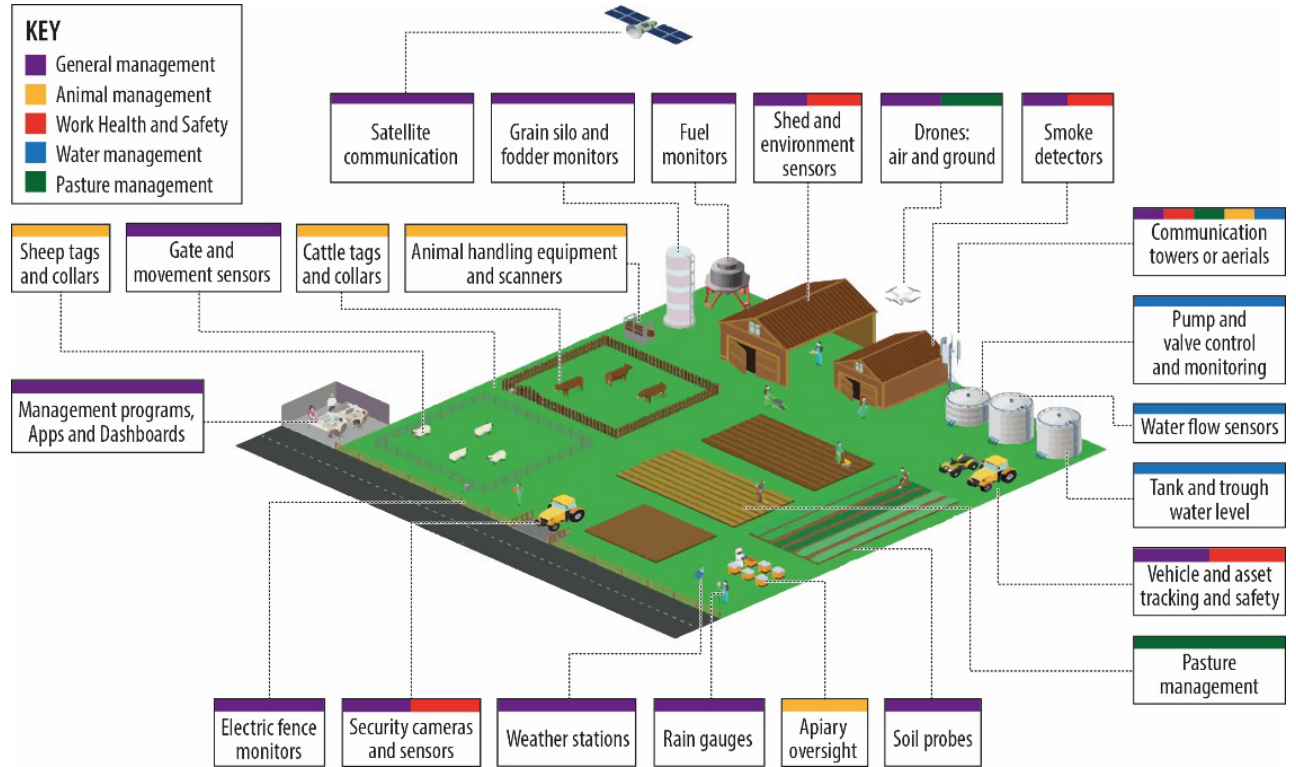
1. Watch [“What is AgTech? The technology that’s disrupting the agricultural industry”, INCYT](#)
2. View slide 6 in the FoTF Agtech Fundamentals online module to complete activity 3 and slide 14 to complete activity 6.
3. List five benefits of Agtech

Any of the following:

- Increased confidence in making management decisions based on farm-specific data and information
 - Increased efficiency through better time management
 - Remote management and geographically distributed sites and resources
 - Improved resource utilisation
 - Gain farm performance insights through more timely access to data
 - Farm security and safety
4. Discussion- Are there any disadvantages of Agtech. *Answers will vary*
 5. List five disadvantages of Agtech
Answers will vary. Could include: cost of purchase, set up and maintenance, connectivity, skill and education of operator/s, training animals to adjust, unemployment through incorporating tech, potential negative impacts on environment, risk of data breach, need to dispose of and update new technologies over time etc.
 6. Discussion- What type of technology have you seen on farms and what was its purpose?
Answers will vary



7. Create a colour coded key to match examples of Agtech devices used in specific ag sectors.



8. View slides 7-10
9. Complete Activities 1a and 1b from the Monitoring Plan.
10. Read slides 11 - 13
11. Complete Activity 2 from the Monitoring Plan.
12. Read slides 14-16
13. The following table lists the management categories and associated monitoring category. Go to the NSW DPIRD Farms of the Future Agtech Toolbox - investigate and list at least two specific examples of Agtech for each management category in the table. Include images where possible.

Management Category	Monitoring Category	Examples
Animal management	<ul style="list-style-type: none"> • Electric fence monitoring • Animal health monitoring • Tracking animal movement • Monitoring animal weight and growth 	<ul style="list-style-type: none"> • Management ear tag e.g. Ceres ear tag • Auto drafter e.g. Gallagher auto-drafter



Asset management	<ul style="list-style-type: none"> • Asset • Fuel tank • Gate and door • Other inputs • Silo • Site security 	<ul style="list-style-type: none"> • Surveillance cameras e.g. AXIS camera • Fuel level sensor e.g. Cropsol diesel level sensor
Connectivity solutions	<ul style="list-style-type: none"> • Antennas • Coverage boosters • Relays, receivers & repeaters • Gateways • Wi-Fi • On-farm connectivity networks 	<ul style="list-style-type: none"> • Web Gateway e.g. CROPSOL iTracker gateway • Wi-Fi antenna e.g. AgTech360 60 degree antenna
Dashboards	<ul style="list-style-type: none"> • Independent integrated dashboards • Supplier dashboards • Computer dashboards • Customised dashboards • Mobile phone apps 	<ul style="list-style-type: none"> • AgriWebb dashboard • Pairtree integration setup
Informed agronomy	<ul style="list-style-type: none"> • Microclimate • Soil moisture • Weather • Pest • Plant 	<ul style="list-style-type: none"> • Digital sensors e.g. Sustainable horticulture, Advanced spray decision station • Weather station e.g. AXIS ultrasonic satellite weather station
Water management	<ul style="list-style-type: none"> • Flow • Level • Pressure • Pump • Irrigation 	<ul style="list-style-type: none"> • MAIT industries, single flood gate with actuator • Agbot Remote liquid level monitor

14. Watch [‘What is IoT and what does it mean for farmers?’](#), Agriculture Victoria

15. Read slides 17-19 to define the following

16. Define the following and explain how they work.

- IoT (Internet of Things)

The Internet of Things (IoT) refers to the network of connected devices and the technology that enables communication between devices and the cloud, as well as the devices themselves.

- Sensor

A sensor is an electronic device that captures data and sends it to a node that in turn transmits it to the internet either directly or via a network and gateway.

- Node

A node is a communication module to which one or more sensors can be attached. The node transmits the data from the sensors to the Internet either directly or via a network and gateway.

- Radio frequencies

The transfer of sensor data from the field by various radio frequencies and electronic devices to the Internet.

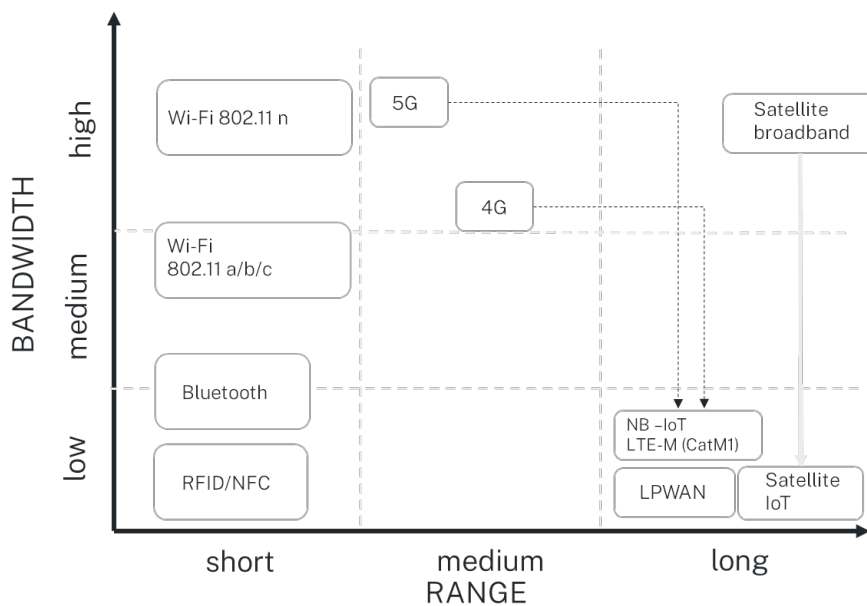


- Gateway
A gateway is a hub similar to an Internet or Wi-Fi modem that translates data from nodes and transmits this data via a connection to the Internet.
- Internet
The Internet is a global data service that shares data between multiple sources and enables the Internet of Things or IoT where all things can be connected simultaneously and shared to multiple partners at once.
- Apps and dashboards
Apps and dashboards interpret the data and provide information for farmers by the Internet or a mobile device.

17. Discuss with your class what societal impacts Agtech and IoT will have on Agriculture.
Answers will vary

18. Read slides 20-25 to complete the following

19. Complete the graph showing the relationship between bandwidth, range and network coverage.



20. Give examples of Agtech which have:

- High bandwidth and short range:
Security camera is an example of a device that uses high bandwidth and only has a short range via Wi-Fi similar to your home.
- Low bandwidth and short range:
RFID (radio frequency ID) system is an example of a device that uses low bandwidth and only has a short range.
- Medium bandwidth and medium range:
A mobile phone operating on either a 4G/5G network is an example of a device which has medium bandwidth and medium range.
- High bandwidth and long range:
Satellite internet provides high bandwidth and has long range for internet access.
- Low bandwidth and long range:
The tank level sensor is an example of a device that uses low bandwidth and has long range via satellite.



21. Explain in your own words the link between connectivity, bandwidth and Agtech device requirements. Use an analogy if it helps (Hint: think about the agricultural pumps)
Answers will vary.
22. Complete the table identifying features of either Mesh connect, gateway connect and direct connect networks.

Connection type	Diagram	Describe how this connection type links devices to the internet
Gateway connect		<p>Devices connect to a gateway via: LoRaWAN, Lora, Wi-Fi</p> <p>A gateway is a hub that transmits data received from the network of devices to the internet. The gateway connects to the internet via: 4G; NB-IoT; LTE-M; Satellite; or NBN</p>
Direct connect		<p>Nodes on devices connect directly to the internet through any of these resources: 4G; NB-IoT; LTE-M; or Satellite</p>
Mesh connect		<p>A mesh network is a network in which nodes on devices connect directly to each other. Data from these devices is transmitted to a gateway node, which connects to the gateway via radio frequencies.</p> <p>The gateway then connects to the internet via: 4G; NB-IoT; LTE-M; Satellite; or NBN</p>

23. Complete Activity 3 from the Monitoring plan
24. Explain what a dashboard is.

A dashboard is a website or application (app) that is used to interpret real time data from various devices and provide information to producers that is easy to understand. It can be remotely viewed on multiple devices including a computer, smart phone or tablet.

25. Read slides 26-30 to complete the following questions 26-27.



26. Describe the Farm Data Code? [Australian Farm Data Code - National Farmers' Federation \(nff.org.au\)](https://nff.org.au)

Developed by the National Farmers Federation in consultation with industry, and support from the Australian Government. It sets best practice standards for digital product and service providers to adhere to. It allows producers and farmers to evaluate the data terms and policies of those providers and understand how their data is used, managed, and shared by the individual providers.

27. Some Agtech providers pass on data to a third party, which potentially could lead to data breaches and cybersecurity threats. Describe measures farmers should undertake to minimise these risks and safeguard data privacy.

Farmers should be fully informed about the data collected and how it will be used.

They can do this by investigating Agtech providers through the Farm Data Code. They must consider their rights in terms of data-use agreements when implementing digital technology and data capture on farm using dashboards. They should have the ability to give or deny consent for data collection and retain ownership of their data.

Farmers should consider using data encryption and secure storage for sensitive data, which can prevent access to data from unauthorised users.

Farmers should only use technology from Agtech companies which have transparent data-use agreements which follow relevant legislation (Farm Data Code) and keep data anonymous and private.

Only use digital devices and services from reputable sources which follow the Farm Data Code.

28. Listen to the podcast: Agtech...so what? Breaking into Agtech when you're not from a farm and 'don't look the part'.

29. Watch:

- [Careers in Primary Industries NSW DPIRD Climate Smart Officer – Matt Pierce](#)
- [Careers in Primary Industries Development Officer Farms of the Future – Clare Belfield](#)
- [What's it like to be an agricultural engineer?](#)

30. Use the internet and other sources to investigate an Agtech related career of your choosing. For this career find out the following:

- Title of the career/job
- Role description
- Personal qualities
- Skills required (if formal courses or education is required, find out where you could train and the timeframe to complete the course, or what subjects to study at school)
- Salary or wage range
- Identify opportunities for job progression in the role

Answer will vary.

Monitoring Plan

See the sample Monitoring Plan in the workbook p33-37. The sample Monitoring Plan should be used as a guide to give students an idea of real-world examples and the depth of content required when creating their own Monitoring Plan.

