Technologies for a Better Farming Future

There are so many new and exciting technologies being developed that can be used in Agriculture; here are just a few of them:

Artificial Intelligence (AI) - There are lots of things that we can use AI for, such as for telling stories, for doing research and for analysing information. One of the most important parts of AI is that you can use it for lots of different things without being an expert in all these things, which can save time and money. This is especially important for farmers who already have a lot to think about:

- Telling stories - AI can create messages and stories about just about anything, including issues relating to the environment. It can gather information really quickly and turn this information into a story that is suitable for any audience.
- Doing research - AI can be used to trawl through lots of research and data, including things like weather information throughout history, data about soil or water quality, or the ways that cultivated or native plants respond to different combinations of soils, fertilisers, pest controls and climatic conditions.
- Analysing information - AI can be used to identify where there might be issues or problems, for example, by analysing data about soil quality and quickly seeing where the soil is too dry or compacted. Or AI can be used to analyse images to find out where the pests are or where water flows during heavy rainfall.

Drones - A lot of us have played with drones, and we know how fun they can be. But drones can be important workers, too:

- Drones can quickly scan a large area, sending back photos and videos so the landscape can be assessed easily and without exploring the whole area on foot or in a car. This could be used to check plant and animal health, fences, pests, etc.
- Drones can be used to deliver or collect things (including picking fruit!).

Robots - I'm sure many of us have dreamt about having a robot around the house to bring us breakfast in bed and clean our rooms. Robots can be used in all sorts of other ways, but doing the hard and tedious jobs that take up a lot of a farmer's time or that they would like to do but don't have time to do. For example, planting trees really quickly or checking how thirsty each plant is and giving each plant just the right amount of water.

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Virtual reality (VR) - Walking or driving around a large property to check on the health of native or cultivated crops can be a lot of work. VR allows people to check on things in real-time without leaving the house. This could be especially useful if you want to check if native pollinators are doing their pollination work, if there are pests around, or if fish in dams and rivers are healthy.

Smelly VR - Scientists in Hong Kong have managed to create a VR system that lets you smell stuff! Not only will you be able to immerse yourselves into new worlds visually, but you could also smell these new worlds. The VR user will need to wear a face mask or a clip under their nose, and the VR headset will go over the top of this.

3**D printing** - you've probably heard of 3D printing, but just in case, let's explore what it is. Normal printing happens when you print text or an image onto paper. There are only two dimensions on a piece of paper: the print of the page and the back of the page. In 3D printing, you get to print something in 3D (three dimensions). Three-dimensional printing adds a third dimension, volume. 3D printing usually uses plastic to create three-dimensional objects.

Living Concrete - Concrete is a super hard and super strong building material that is one of the main ingredients of buildings and cities. Making concrete also releases a lot of carbon emissions. However, scientists have developed what they call 'living concrete'. This is done by combining sand, gel and bacteria. The scientists behind living concrete believe that structures made from this new material could "heal their own cracks, suck up dangerous toxins from the air or even glow on command".

Smart glasses - Not only can smart glasses keep the sun out of your eyes, they can take videos and photos, some can play music, and some can project a little computer screen into the corner of your eye. These could be used by farmers to take photos or to check what they're seeing today against what they saw last week or last year.

Digital twins - Digital twins are virtual simulations of real-world things (like farms or ecosystems) that can be used to test new ideas in a safe digital environment. So rather than spraying a new fertiliser on a real crop of plants, farmers could spray it in the digital twin version of their farm and see how it affects their farm. They could also choose to alter the weather, pests or other factors to see how their farm would respond to different conditions without threatening the health of their farm or surrounding wildlife.

Renewable energy - Most of us are familiar with some forms of renewable energy, like solar power or wind power. These types of energy are better for the environment than energy from fossil fuels (like gas, petrol, diesel or coal) because they don't release carbon dioxide that contributes to climate change. At the moment, though, we are mainly using renewable energy to keep power on in our buildings, but there is the opportunity for so much more. Farming equipment and machinery could be run on renewable energy, as well as any new technologies designed to help farmers manage their farms and care for our environment.