Clarity needed for drone use in environmental compliance

An investigation of farmers' and rural professionals' perceptions of adding drones to environmental compliance processes, such as farm environmental plan audits, reveals a lack of clarity about how information gathered by 'eyes in the sky' might be used.

Canterbury farmers' and rural professionals' perception of drone use in environmental management

Participants: Eight Canterbury farmers (arable, sheep/beef, dairy and dairy support) and six rural professionals

Project team: Dr Sharon Lucock (Lincoln University), Dr Victoria Westbrooke (Lincoln University), Sam Mander (The Agribusiness Group) and David Stevenson (farmer)

Report: Project Final Report – Canterbury Farmers' and Rural Professionals' Perception of Drone Use in Environmental Management (ourlandandwater.nz/RPF2020)

Technical information

Project aim: Identify barriers to the use of drones in environmental compliance, monitoring and management, and incentives to overcome these barriers.

- Eight Canterbury farmers and six rural professionals were interviewed about the use of drones as part of farm environment plan (FEP) audits.
- Trust between farmers and auditors was identified as a fundamental requirement before farmers would permit a drone to be used.
- Benefits of using drones for environmental management include time-saving, providing additional evidence, and the reduction of health and safety risks. Additional evidence needs to be backed up by site visits and discussion, particularly when it reveals an environmental problem.

Unmanned aerial vehicles (drones) are increasingly used on farms for everything from mustering stock to mapping, but have not yet been widely used to monitor environmental compliance. However as New Zealand entered Alert Level 2 restrictions during the Covid-19 pandemic in 2020, to maintain his social distance from farmers Sam Mander of The AgriBusiness Group trialed using drones in FEP audits.

When Sharon Lucock, a senior lecturer in agribusiness management at Lincoln University, heard about Sam's trial, she was intrigued. She thought it would be worthwhile to undertake an investigation to uncover the perceptions of farmers and rural professionals about the use of drones for environmental compliance purposes. "At the time there were also some concerns expressed by regulatory agencies about whether drones would be an effective tool," she says. A successful application to the Our Land and Water Rural Professionals Fund provided the opportunity to collect information.

Sam Mander operates a drone business, Dronescape, in Canterbury, alongside his role as a rural professional and environmental consultant. Sam mainly uses drones for mapping and analysis. He believes drones could be a valuable tool for farm environmental consulting. "They make our workflow for certain tasks much more efficient and accurate. You can fly around the farm instead of driving everywhere, and you're gathering higher-quality evidence through geo-referenced aerial photos and videos, which leads to a higher degree of environmental monitoring," he says.

In Sam's experience, drones provide a valuable alternative insight into what's happening on-farm that you can't get from the ground.

In the project, researchers observed interactions between eight Canterbury farmers and three rural professionals as

Drone-captured image of Canterbury farm

The farmers who participated in the research project were generally apprehensive about allowing drones to fly over their property.

they audited compliance with FEPs, and then interviewed both the farmers and the auditors. Another three rural professionals, who were aware of drone use in FEP audits but currently do not use them, were also interviewed to understand their perspectives.

Farmers apprehensive

The farmers who participated in the research project were generally apprehensive about allowing drones to fly over their property. "My observation has been that some farmers are anxious about having an eye in the sky going over their property because it's a bit invasive," says Sam.

Canterbury farmer David Stevenson had already been through one FEP audit before Sam approached him with the idea of using a drone to help with his next one. "I felt really comfortable about it, but that's because I'd gone through one audit and this was my follow-up audit for the year. I only had to show the auditor a couple of things I had to do to get my grade up, so it was easy that way," he says.

David believes he would probably have felt differently if it had been his first audit and understands other farmers' anxiety. "I think the biggest thing that all farmers are scared of in the current climate is drones being flown around and pictures being taken, and videoing being done from above, and where those pictures and videos will end up," he says.

A variety of other obstacles to the effective use of drones on-farm were identified during the project, including weather. Drones do not perform well in high winds and cannot be flown in the rain, so weather is one of the biggest issues in overcoming farmer's distrust of how they might be used.

Trust critical

The report says that without a critical level of trust between the farmer and auditor, the drone would not be allowed to fly on-farm. The audit process was stressful for the farmers, with those interviewed expressing a sense of relief when the audit was completed and the auditor had left. The farm tour also changed from the 'farmer driving the auditor around' to the 'auditor flying the farmer around', which is a change in who is driving that part of the process.

"There is consistency around the level of trust that the farmer has for the auditor as a determining factor for whether or not the drone is going to be allowed to be used," says Sharon.

Providing clarity around the use of drones is key to the successful use of the technology during environmental audits.

Three principal benefits were identified from using drones for environmental management purposes (see Figure 1):

- Time-saving
- Providing additional evidence from an aerial perspective
- A reduction of health and safety risks, e.g. driving on steep or slippery farm tracks.

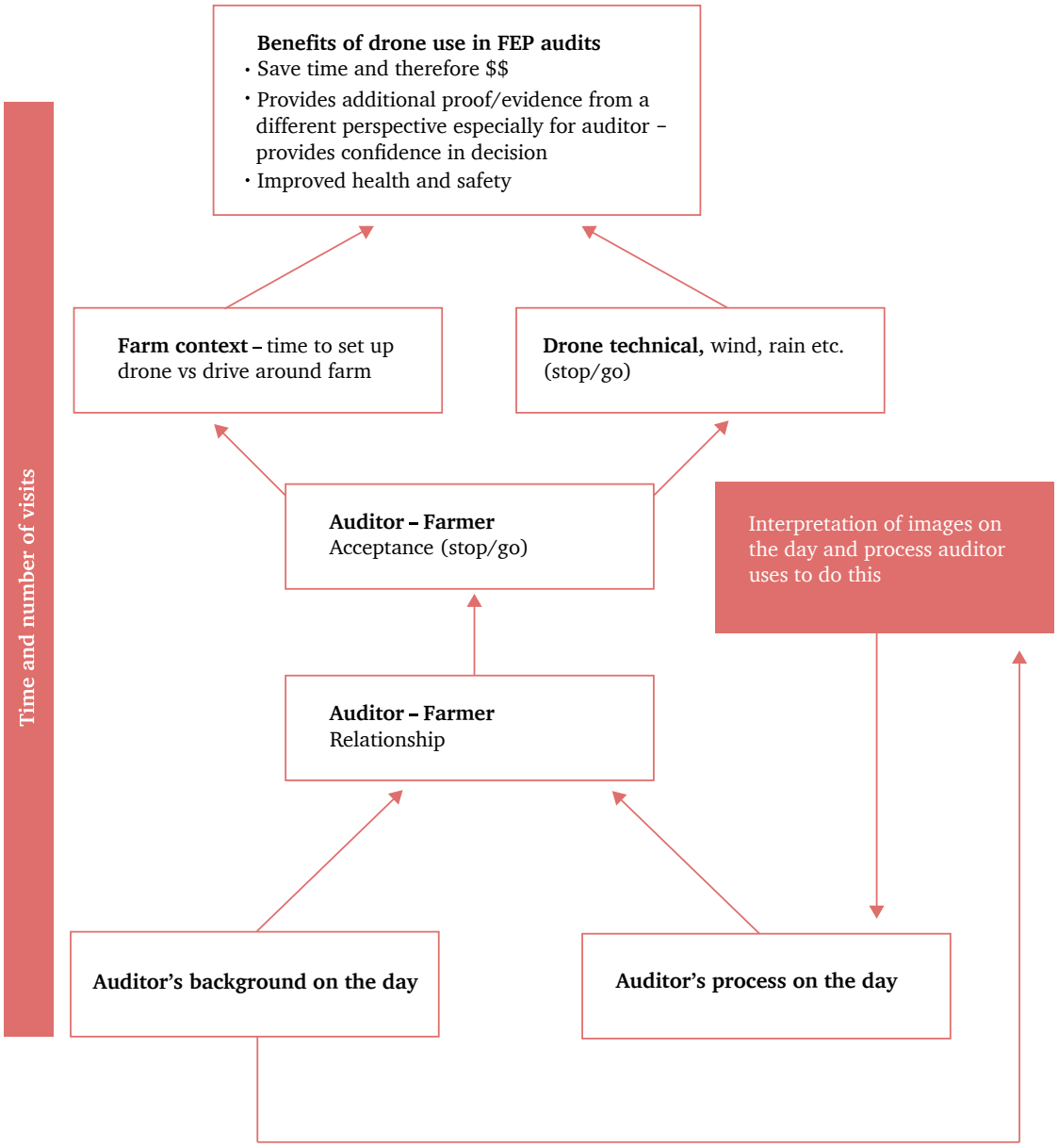

Figure 1: Conditions and advantages of drone use in FEP audit process

One of the requirements for the audit process when drones are used is that farmers can view the same pictures being beamed down to the auditor on a separate screen so that the farmer and auditor can talk about what they're seeing.

Sam says he's found that once farmers become familiar with the technology and how it's used in the audit process, and get to know the auditor, some of the barriers usually break down.

"Once you're flying the drone and interacting with them on the screen, they can see what it's viewing and that increases their confidence in being willing to use them. A lot of the time, by the end of an FEP audit when you've been using the drone, they thought it was a cool technology."

He believes drones are a valuable tool, and that compared with other countries New Zealand agriculture has been slow to take advantage of them.

"The rest of the world's been using them for a lot longer. I think it's going to be really helpful for industry, for farmers and for consultants when used appropriately," he says.

David believes that drones will eventually be accepted. "It will take a little bit of time and a few guinea pigs just to show that all these pictures aren't going to go anywhere, that you can't be prosecuted from them or anything like that. It's the same as if someone walks or drives around the farm, so it's just part of the audit and that's it," he says.

Next steps

The project team has planned workshops to deliver the research findings face-to-face to interested farmers, and to seek feedback about how future research can be directed.

– Tony Benny for Our Land and Water National Science Challenge (CC BY-4.0)