Mobile plant safety on farm: practices and perceptions

Snapshot report, May 2024

- Mobile plant is an essential part of farming. Farms typically used 6 of the 10 plant types asked about in the 2023 survey.
- Mobile plant is risky. One in 10 fatalities on Australian farms have been associated with equipment other than tractors and quad bikes.
- What growers see as the riskiest plant on their farm differs between farms. Post-hole diggers/drivers were nominated as the riskiest on 35% of farms and augers on 33% of farms.
- Most growers (90%) believe others on farm expect a high standard of safety when risky plant is used.
- Work practices support safe operation of the riskiest equipment. Many check equipment before use (90%), restrict who can use it (66%) and give safety briefings before starting high risk jobs (73%).
- People see the big risks to safety as time pressures, fatigue, distraction, lack of operator competency, machinery neglect and machinery modification.

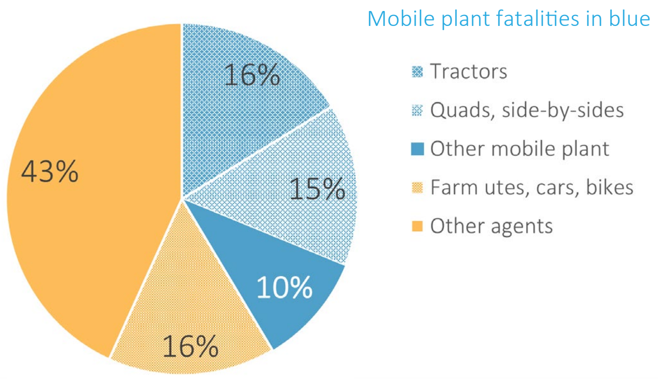
Industry-wide safer use of mobile plant is likely to require a specific focus on each type. The most effective changes will occur at different parts of the whole safety system for that particular equipment. The case study of augers provides an example of this.

Australian agriculture has the highest work-related fatality rate of any industry (Safe Work Australia) and mobile plant is the lead agent for fatalities on farm [134].

Mobile plant refers to a diverse range of equipment and machinery – including tractors, quad bikes, post hole diggers and augers – that have some form of self-propulsion, are under the direct control of an operator and are typically not used on a public road [National Model WHS Act and Regulations 2021].

Figure 1. Farm fatality data over 20 years

AgHealth Australia data 2001-2020 [134]



While tractors and quad bikes are the predominate agents, one in every 10 fatalities on farm is associated with other mobile plant types (Figure 1).

People's attitude to safety shapes their behaviour [13,180, 335]. Having safety front of mind is important for all farm machinery as even some less common injuries can be extremely traumatic when they happen (with augers, post hole diggers [281], hay baling equipment [293] as examples).

This snapshot describes practices and perceptions around mobile plant safety on Australian farms in 2023. The information comes from research conducted by Work Science, including 49 interviews and a survey of 229 growers.

Work Science used the Health Belief Model to help assimilate interviewees' perspectives on why people on farm do, or don't, adopt safe practices when using mobile plant.

Practices and perceptions

A better understanding of what farmers think and do around mobile plant safety will help the agricultural industries foster safer behaviours.

Growers were asked about 10 different types of mobile plant (listed in Figure 2): what was used on the farm, how often, and what they saw as the riskiest.

Each of the 10 mobile plant types were nominated by at least one of the farms with the equipment as the riskiest to operate. The most commonly selected equipment were post-hole diggers/drivers and augers.

A diverse range of farm businesses contributed to this description. The farms ranged from 60 to 1,600,000 hectares in size, over 80% had livestock, and about two-thirds produced a mix of commodities (Figure 3). Most were family farms (95%) and eight were corporate farms.

The median workforce at peak was 5 people (range 1 to 350), and more than half of the farms (57%) had used one or more contractors in the previous year.

Farms typically used six types of mobile plant (Figure 4), with augers, spray booms, planters, slashers and post-hole diggers/drivers used on four in every five farms.

Questions were then asked about practices associated with use of the riskiest equipment.

Who used the plant on farm was often restricted (66% of farms) and it was typically checked before use (93% of farms) (Figure 5). (Figure 6, pages 4-5, show this for each mobile plant type.)

Figure 2. Plant that is seen as the riskiest to operate

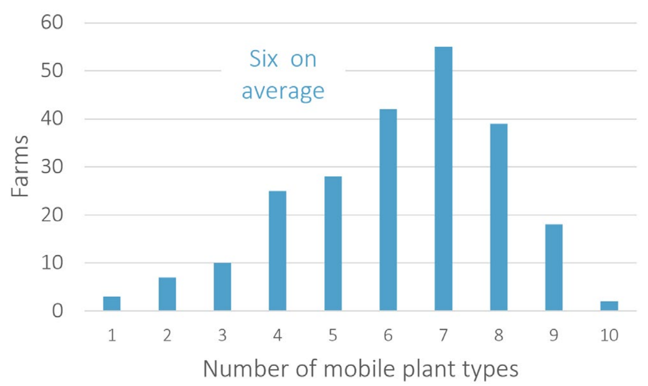
Mobile plant type	Proportion of farms with plant that see it as riskiest
Post-hole digger/driver	44%
Auger	39%
Telehandler	22%
Harvester	13%
Hay wrapper / rake / spike	10%
Slasher	8%
Forklift	7%
Spray boom	2%
Planter	<1%

Note Cotton gins not reported as used on less than 10% farms.

Figure 3. Characteristics of the 229 survey farms

Farm focus	Farms in survey	Size (median)	Workers at peak (median)
Beef	36	2,200 ha	3 people
Dairy	26	700 ha	7 people
Sheep	12	805 ha	5 people
Beef-Sheep	24	950 ha	4 people
Cotton-Grain	36	2,000 ha	5 people
Grain-Sheep	29	1,700 ha	5 people
Livestock-Crops	63	2,000 ha	5 people
Other	3	1,800 ha	4 people
All	229	1,600 ha	5 people

Figure 4. Multiple mobile plant used on farms



Growers generally felt that others on the farm expect the highest safety standard when that particular piece of mobile plant is used (90% of farms), and that workers regularly tell each other about changes in conditions that could affect how it is used (73% of farms).

Notably 8% of growers had themselves been in a situation where they felt their level of knowledge or skill had been inadequate. This was associated with seven different plant types, including post-hole diggers/drivers (for 7 growers) and augers (for 4 growers).

Fifteen percent of growers had mobile plant, which they identified as the most risky, that had been modified for use on their property. Again augers were a feature having been changed on 14 farms.

While it is not possible to say whether modifications were to improve safety or utility, it is of note that a person who modifies plant has the same obligation as a designer and a manufacturer under the WHS Regulations.

The Work Science survey suggests an upward trend in safe practices on farm when it is compared to a 2011 survey of 628 farms (Figure 7). While indicators such as regular hazard inspections, safety briefings and safety management plans are more prevalent, it is important to note that none have been universally adopted.

Figure 5. Practices associated with the riskiest mobile plant

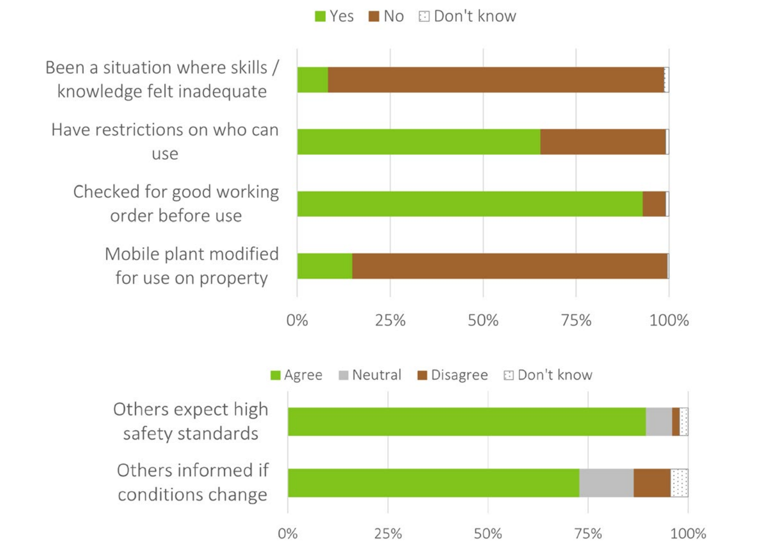


Figure 7. Increase in indicators of safe practice

2011 survey of 628 farmers [329]

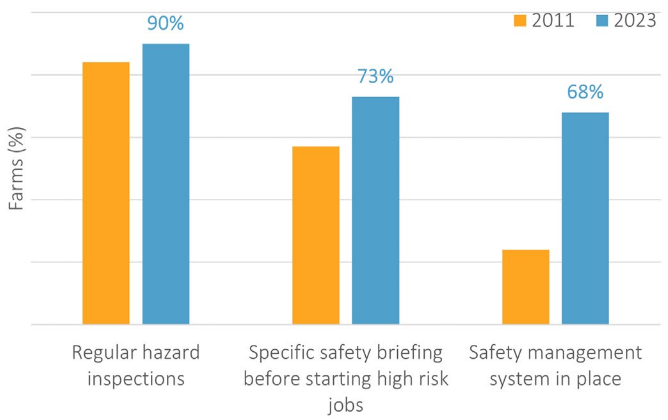
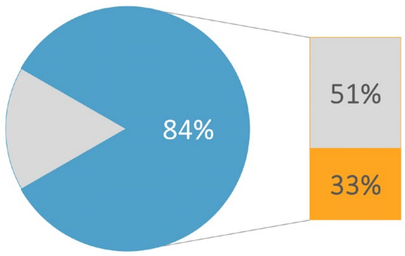


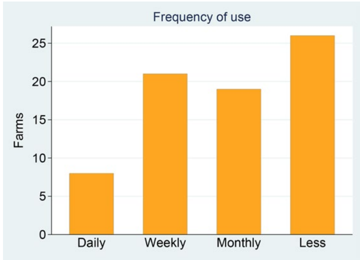
Figure 6. On farm practices and perceptions for each mobile plant

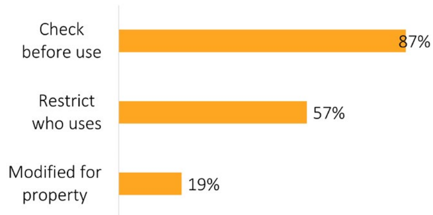
Proportion of farms with plant (229) Number of farms that see it as the riskiest plant to operate

Auger

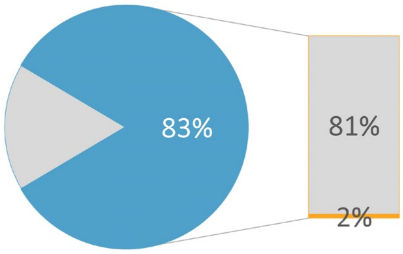


On the 75 farms that see as riskiest:

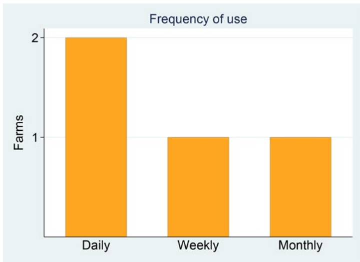


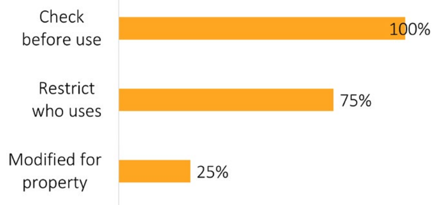


Spray boom

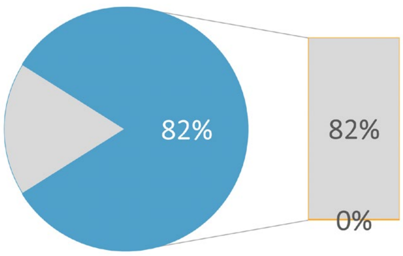


On the 4 farms that see as riskiest:



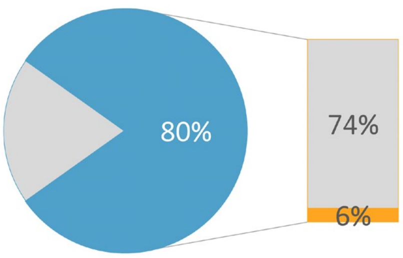


Planter

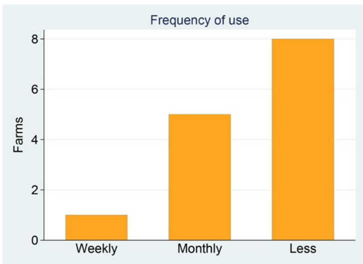


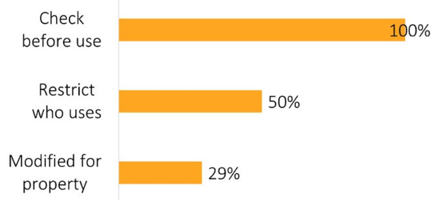
One farm nominated a planter as their riskiest equipment, and it was used less than monthly.

Slasher

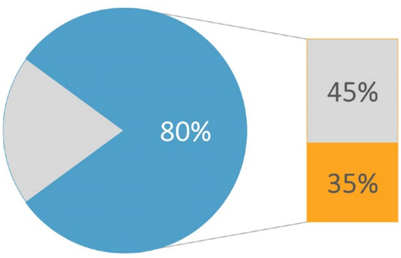


On the 14 farms that see as riskiest:

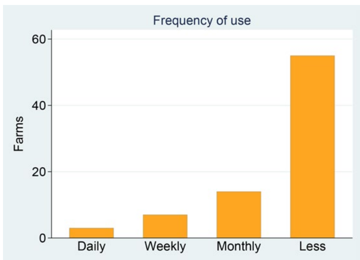


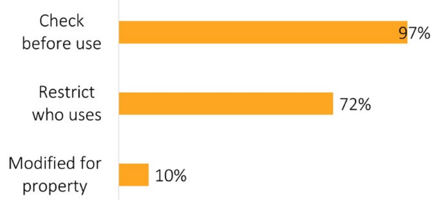


Post-hole digger / driver



On the 79 farms that see as riskiest:





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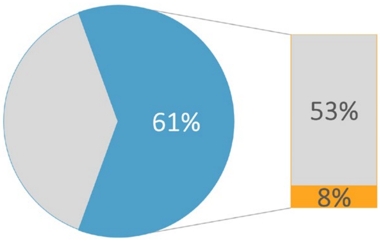
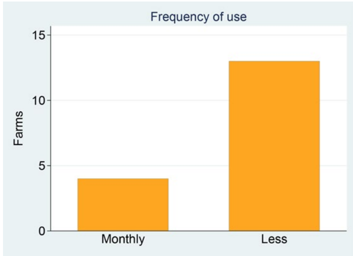
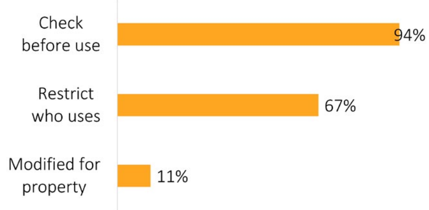
Harvester

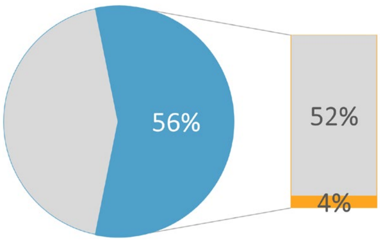


On the 18 farms that see as riskiest:

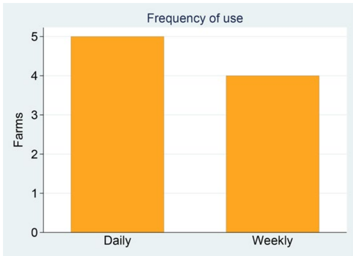


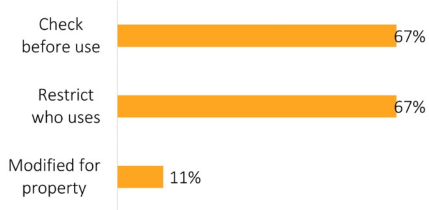


Forklift

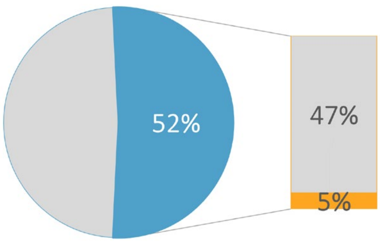


On the 9 farms that see as riskiest:

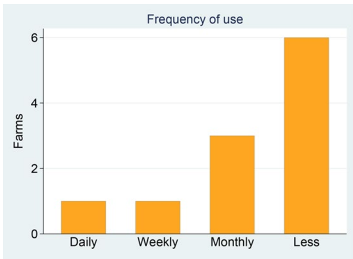


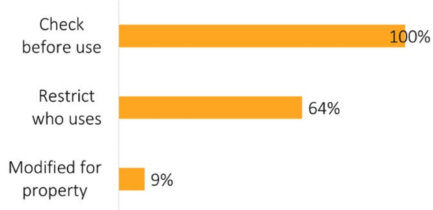


Hay wrapper / rake / spike

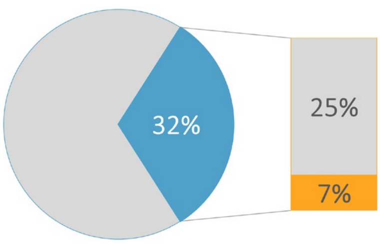


On the 11 farms that see as riskiest:

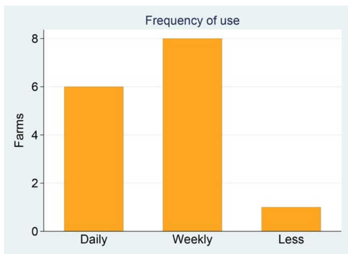


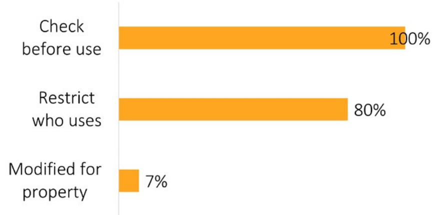


Telehandler

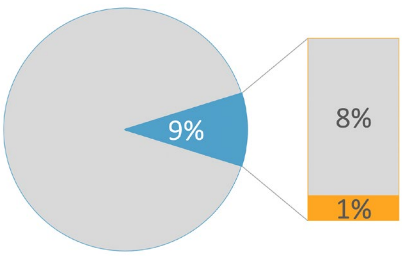


On the 15 farms that see as riskiest:





Cotton gins



Results not presented as cotton gins used on less than 10% of survey farms.

Behaviour change opportunities

Work Science interviewed 49 people from agricultural sector to explore attitudes and beliefs around mobile plant safety. More than two-thirds of interviewees were from farms (Figure 10) and 80% of them were in the grains, beef or cotton industries.

Interview responses were framed in terms of the Health Belief Model.

The Health Belief Model examines why people do or don't adopt preventative practices – and over the last 60 years has been applied to issues from breast screening to covid vaccination. The model is used to design messaging that aligns with the beliefs and attitudes of the target audience [320].

In this model, whether people take preventative action depends on the severity of the consequences, how susceptible they see themselves, their capacity to do something, and the benefits and barriers of acting (Figure 11).

The perceived benefits and barriers are typically strong predictors of behaviour change [343].

Figure 10. Two-thirds of the 49 interviewees were from farms

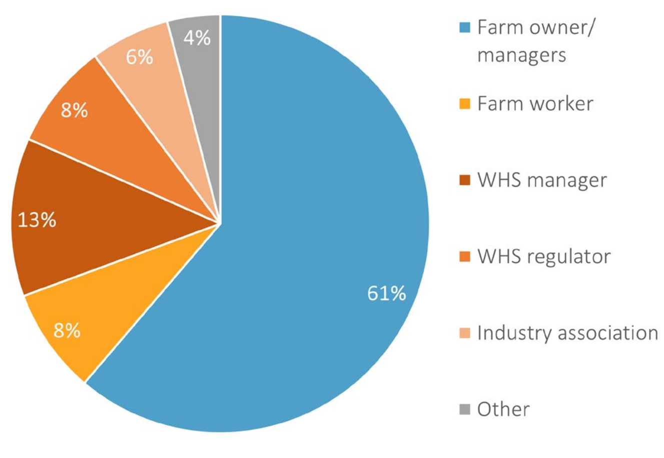
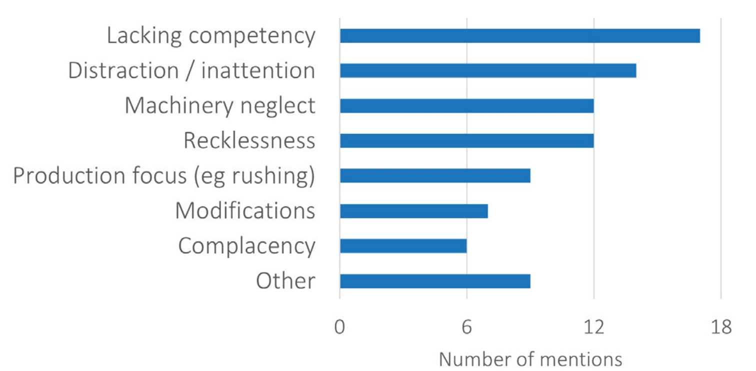


Figure 12. Unsafe practices that concern interviewees



A 2006 study of Australian farmers' attitudes to health and safety [314] found that:

- A prevailing attitude was '*it won't happen to me*' - where farmers did not feel their family or lifestyle was at risk of serious repercussions.
- Farmers believed that the barriers (largely cost and time) outweighed the benefits of changing behaviour– and many farmers had difficulty identifying particular benefits of making a change.

In contrast, the 2023 Work Science study shows that potential for injury associated with mobile plant use does concern many in the agricultural industry - with repeated mentions of several types of unsafe practices by interviewees (Figure 12).

Time pressures and fatigue were also felt to be important contributing factors to unsafe operation by interviewees (43% and 26% respectively).

A feeling of being vulnerable / threatened ('it could happen to me') is one of the pre-conditions for taking action under the Health Belief Model.

However the types of barriers mentioned by interviewees in 2023 may still outweigh the perceived benefits of making change (Figure 13).

Figure 11. Areas explored by the Health Belief Model

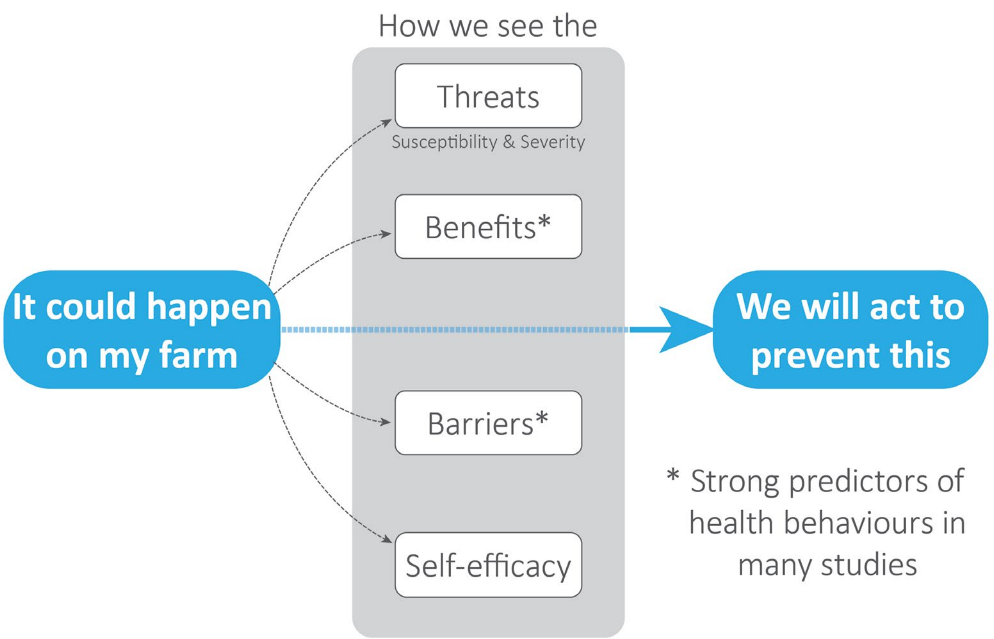
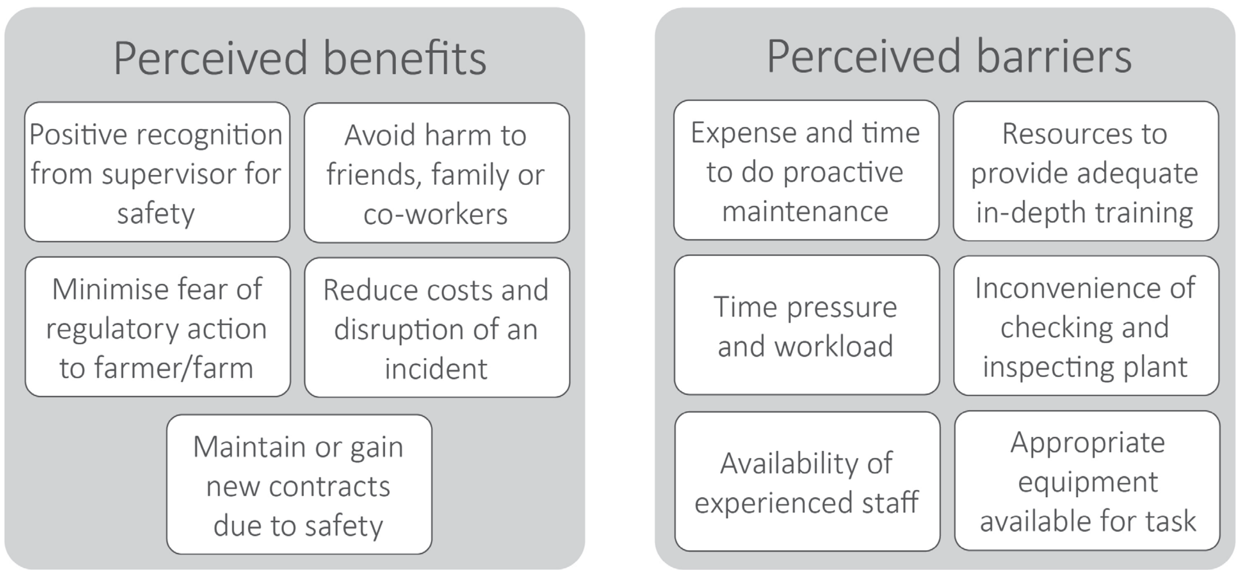


Figure 13. Benefits and barriers from the interviews by Work Science



System supporting safe use

Workplaces are legally obliged to manage hazards so that people are not harmed. The likelihood and severity of injury are influenced by many factors, some being controlled on farm (through machinery checks, purchase decisions, safety briefings etc) and some externally (such as regulation, access to training, and integration of safety features in equipment design).

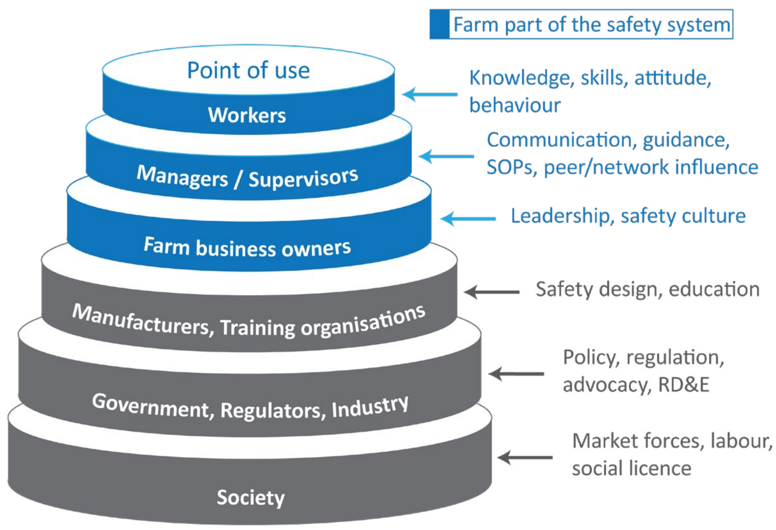
Work Science recommended a Rasmussen-inspired model as a way of systematically considering risk controls across the entire safety system for specific mobile plant (Figure 14). This framing helps identify points of consideration.

For example the difference in safety management systems for family and corporate farms becomes immediately obvious. On corporate farms, directors set the safety standards implemented by managers and formalised in standard operating procedures. On family farms - such as the 218 farms in the grower survey - these responsibilities often sit with one individual, in which case changes in attitude and behaviour will be highly dependent on interaction with significant others (such as peer groups and family) or a near miss event [180, 328] (Figure 15).

RSHA is using the Rasmussen model to map risk controls across the safety system for augers - given that they are on four in every 5 farms, typically used multiple times a month and are regarded by many growers as the riskiest equipment to oeprate.

This appraisal will determine its effectiveness as a tool for industry to identify gaps and strengthen safety messaging for farm.

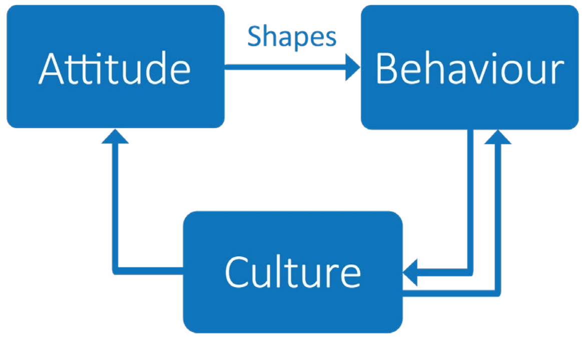
Figure 14. Safety at the time of mobile plant use is a function of the whole system



"Farm owners and insurance companies are the most influential in driving farm safety. We need to remove time pressures, earn trust of owners by demonstrating safe operation of machinery, share the lessons that we learn…"
- from 2023 interviews

Figure 15. Attitude shapes an individual's behaviour

Adapted from [180]



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Please note the numbers are not sequential as the references come from a larger RSHA library

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awi Australian Wool Innovation Limited | Australian Pork | Dairy Australia | AgriFutures Australia | Australian eggs | GRDC Grains Research & Development Corporation | CRDC Cotton Research and Development Corporation | mla Meat & Livestock Australia

A RSHA snapshot report

The RSHA enables cross-sector investment by rural Research and Development Corporations to improve safety on Australian farms. This research was commissioned by RSHA and conducted by Work Science (AgriFutures Australia Project PRO-016219).

Rural Safety Health Alliance, May 2024