

## Occupational Health and Safety on Australian Farms: 2. Improved Management and the Driving Forces for Practice Change

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### Abstract

A subset of data from a broader, longitudinal study of 335 farm enterprises throughout New South Wales, Australia, was examined focusing on the changes farmers were making to farm health and safety and the motivating drivers behind those changes. The most frequently reported changes to health and safety by participating farm enterprises were shearing shed safety improvements, improved chemical safety and handling, purchasing new equipment or upgrading existing equipment, greater provision and access to personal protective equipment and improving safety of stockyards and procedures. When the drivers behind the changes to farm practice were assessed, occupational health and safety requirements or legislation were the most frequently reported by participating farm enterprises, followed by increased safety awareness or consciousness, a general desire to improve safety and standards on their farm, the realisation or identification of a risk or hazard and to gain improved efficiency or cost savings. The research has questioned some preconceived ideas relating to farmers' perceptions, attitudes and practices in relation to farm safety and has identified potential new approaches for increasing adoption and implementation of farm safety recommendations.

**Key words:** farm; health and safety; farm management; agriculture; practice change

### Introduction

This paper is one component of a broader longitudinal study, focusing on two free-text questions in the baseline questionnaire designed to examine changes made to farm safety management systems and practices over the preceding 12 months and the factors and motivations behind the changes. The rationale for the study and examination of data on farmers' perceptions is reported in a companion paper (Pollock, Fragar and Griffith, 2014).

### Literature Review

Farmers routinely suggest that farm safety takes too much time, is too costly and involves too much paperwork, but there are changes being made to occupational health and safety (OHS) systems on farms. So what are these changes? What is driving farmers to make changes? How do documented key hazards rate in comparison to what farmers see as risks on their farms?

Day and Stathakis (2004) undertook a qualitative and quantitative study to monitor changes in farm safety in Victoria over the period 1997–2001. They found that farmers were making changes to OHS systems and practices on their farms, with small increases in the number attending training sessions, in the number of tractors with Roll-Over Protection Structures (ROPS) and in the number of farmers using safety equipment and devices. Over the same period, there was a 14 per cent reduction in serious work-related injuries, although the link between these changes and the reduction in injury was reported as being unclear.

Durey and Lower (2004) investigated the attitudes and beliefs of a small sample of Western Australian farmers, focusing on the development of a safety culture and the reluctance of farmers to adopt State OHS regulations. The study found that, despite improvements in the awareness and importance of farm safety, significant gaps existed between knowledge and practice. While most of the sample farms rated the standards of safety on their farms as '*high*', there was a very strong message that farm safety was not a prime consideration on their farms, falling victim to a production- and profit-related focus. Farmers were also driven by improvements in ease of management and cost efficiency, with the safety improvements being more of a by-product. While the majority of participants believed that some

regulations for farm safety were necessary, most felt that they were impractical and were unsure how to comply.

Sandall and Reeve (2000) researched the attributes of farm hazards that are used by farmers to make decisions about accepting or reducing the risk associated with the hazards. They also produced and interpreted perceptual maps to illustrate how farmers perceive hazardous situations that can lead to physical injury, relative to other hazards that they face in the farming occupation. They observed consistent patterns in the combinations of attributes that farmers associate with different hazards. For example, animal handling hazards tend to be associated with high likelihood, low controllability and low consequences, while machinery hazards tend to be associated with moderate likelihood, high controllability and high consequences.

The issue of controllability raises key issues for safety promotion approaches. Perceptions of '*low control*' can lead to difficulties in encouraging farmers to take preventative action for perceived low control hazards and '*high control*' hazards can result in farmers concluding that no further action is required, as the matter is in hand.

The Australian Safety and Compensation Council (ASCC, 2006) conducted a qualitative study into the improvement of OHS outcomes in Australian agriculture. Their aims were to identify the drivers or motivators influencing behaviour change, determine the critical issues, barriers and gaps preventing improved OHS performance, and establish why recent efforts were not leading to an improvement in OHS in agriculture. They also aimed to define pivotal national actions or key characteristics likely to address the critical issues identified and build upon drivers of behaviour change to inform the design and delivery of future national actions or projects.

The study highlighted that attitudes to safety were a significant barrier to the successful uptake and implementation of OHS programs in agriculture. Many respondents believed unsafe behaviour, or a calculated risk, was acceptable, if you '*knew what you were doing*' and that '*commonsense*' is a major requirement in avoiding farm injury. Another interesting observation was that near misses may improve the awareness and behaviour around a particular piece of machinery or equipment, but it doesn't translate to an improvement in their overall attitude to safety.

As observed in earlier studies, ASCC found that, to some extent, safety requirements and financial considerations were seen as competing priorities and there was the distinct perception that safety costs money. Of concern was the observation that farmers described themselves as experts in farm safety and that many accidents could be explained away as carelessness which, whilst not desirable, was an understandable consequence of busy farm lifestyles.

Legislation was negatively perceived by all ASCC study respondents. While some negativity was more philosophical, such as the need for autonomy and personal responsibility, others saw it as offering no improvement to farm safety and in some cases even creating more hazards than it alleviated. The presence of, and risks of penalty for non-compliance with, legislation was a frequent concern and inhibitor in the hiring of outside labour.

There has been substantial research into farm safety interventions. The most common intervention approach tends to be through education and awareness programs. However, Murphy et al. (1996) challenge the success of this approach, suggesting that farmers are not making the connection between the education and awareness programs and the elimination, reduction and control of physical hazards and the modification of work behaviour that may cause injury.

Stavea et al. (2007) follow this notion further, suggesting that the focus of interventions is often on technical measures, aiming at controlling specific hazards; while this may result in risk reduction, social and psychological factors hindering or promoting safety activity ought to be further explored. Their approach was to create socially supportive networks of Swedish farmers to encourage discussion and reflection, focusing on risk manageability. They found that, while there were no changes to risk perception and perceived risk manageability, there was a significant increase in safety activity and a significant reduction in stress and risk acceptance.

The idea of elimination, reduction and control of hazards raised by Murphy et al. (1996) and Stavea et al. (2007) is consistent with the approach taken by Australian work safety authorities, where it is framed as the '*Hierarchy of Control*' (Figure 1). The hierarchy, based on the ten countermeasures of Haddon (1973) for injury prevention, involves the legal obligation to apply the five levels of control, or a combination of the five levels, in the order specified, to reduce the risk to the lowest level reasonably practicable (New South Wales Government, 2001).

Essentially, the hierarchy is weighted towards design-based solutions over a dependence on modifications to worker behaviour and practice. The first preference is to eliminate the hazard; that way the associated risk is completely removed. If it is not practicable to remove the hazard, the next step in the model is to substitute the hazard for another process, mechanism or machine that presents less risk. If this is not possible, the next approach is to re-engineer or design the work process or isolate the worker and others from the hazard. Failing engineering solutions, the fourth level of the model is to use administrative control to reduce the risk, including setting and maintaining rules and standards for work processes, providing training, skills maintenance, safety inductions to workers and new machinery and systems. Finally, if all these measures are not reasonably practicable, then the last resort for risk minimisation is the provision, use and maintenance of personal protective equipment (PPE).

## Methodology

The survey is explained in the companion paper (Pollock et al., 2014). This paper concentrates on two of the free-text questions at the end of the survey.

The first of the questions, *'What changes have you made on your farm in the past 12 months to improve farm safety?'*, was included in the questionnaire to establish data, facts, experience and perceptions to counteract the approach to farm safety commonly portrayed in the media as to why farmers are *not* implementing farm health and safety systems on their farms. *'It's too costly'*, *'too time consuming'* or *'too much paperwork'* are frequently given as reasons, but there are farms making significant changes to their management systems and processes and it is important for promotion and awareness initiatives to have an understanding of these changes to effectively target their campaigns.

ACAHS, Farmsafe Australia, work safety authorities, industry, research and development organisations and farmer groups have all invested a significant amount of resources in both raising the awareness of key hazards on farms and in developing practices and systems to minimise these risks. But how effective have these programs been? This question suggested the inclusion of the free-text comment box, *'What prompted you to make these changes.'*

## Results

### *Changes made on farm*

The first free-text question, *'What changes have you made on your farm in the past 12 months to improve farm safety?'*, was well responded to by most enterprises (n=303, 90.4 percent), with a total of 810 changes reported. The responses were grouped into categories and sub-categories (Table 1), which were then assigned a level of control, based on the *Hierarchy of Control* model, as detailed in Figure 1.

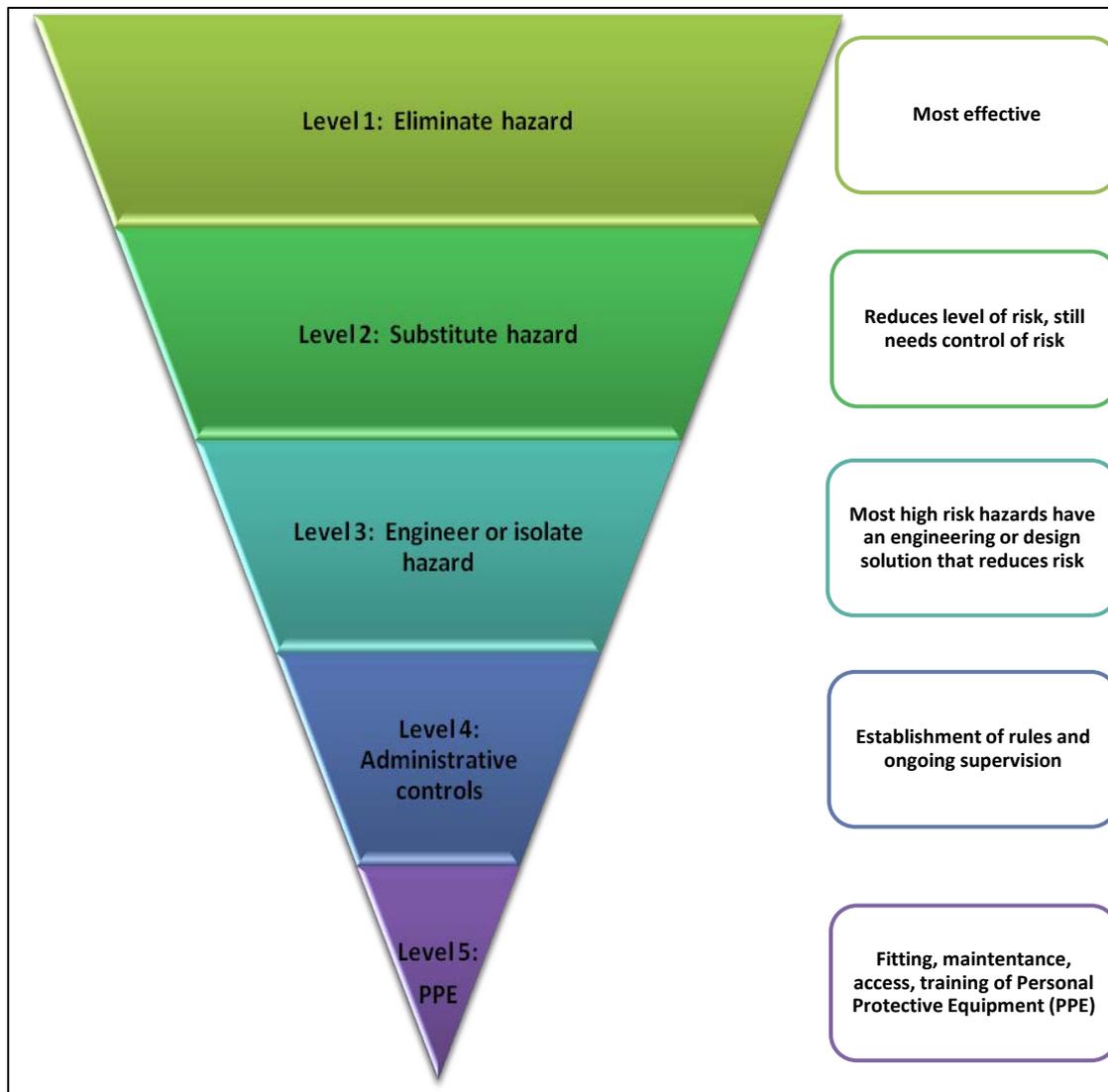
The most frequently reported changes to health and safety by participating farm enterprises were shearing shed safety improvements (Level 3, n=58), improved chemical safety and handling (Level 3, n=53), purchasing new equipment or upgrading existing equipment (Levels 1, 2 and 3, n=47), greater provision and access to PPE (Level 5, n=46) and improving safety of stockyards and stock handling procedures (Levels 2 & 3, n=42).

The most effective level of control, Level 1 (Elimination of the hazard), was not frequently reported as one of the changes made in the past 12 months. The only Level 1 changes reported including the installation of Residual Current Devices (RCDs) and improved electrical safety (n=24), cleaning up hazards in the farm environment (n=18), improvements in child safety and provision of safe play areas (n=9), restriction of access to hazards (n=5), decommissioning of windmills (n=3) and removal of motorcycles or horses (n=3).

There were some additional changes which encompassed several levels of control (Levels 1, 2 and 3) including purchasing new equipment or upgrading existing equipment (n=47), improved pump maintenance or replacement of pump with solar power (n=5) and improved automation of procedures (n=4).

Just 11 enterprises stated they had made no changes to farm health and safety in the past 12 months, while another 32 enterprises did not complete the question.

**Figure 1: Hierarchy of Control**



Source: Adapted from Pollock, Fragar and Temperley (2008)

**Table 1: Changes made on farms, by level of control**

<b>Changes made on farm</b>	<b>Frequency reported</b>
<b>Level 1 – Elimination of hazard</b>	<b>62</b>
Residual Current Devices (RCDs) and electrical safety	24
Clean up of farm hazards	18
Child safety and safe play areas	9
Restricted access	5
Decommission windmills	3
Removal of motorcycles and horses	3
<b>Level 2 – Substitution of hazard</b>	
No changes reported	
<b>Level 3 – Engineering or isolation hazard</b>	<b>320</b>
Shearing shed safety	58
Chemical safety	53
Guarding - generic	37
PTO guards	36
Silo safety	35
Fuel tank safety	21
Auger guard	16
Workshop safety	15
Improved fencing	12
Shed safety	8
Irrigation channel safety	7
Powerlines safety	7
Safety improvements for working at heights	7
ROPS	5
Motorcycle and ATV safety	3
<b>Level 4 – Administrative controls</b>	<b>199</b>
Safety signage	31
Regular maintenance and maintenance records	26
Road and vehicle safety	22
Reviewed safety operating procedures and plans	19
Awareness of responsibilities, hazards and risks	18
Induction and training	14
OHS Meetings and discussions	13
Hazard checks	11
Changes to employees and contractor numbers	7
Improved staff screening/employee management	7
Improved communication access	6
OHS Manual or plans	6
Safety audits and record keeping	6
Improved farm and machinery organisation	5
Ongoing part of management	5
Visitor safety	3
<b>Level 5 – PPE and training</b>	<b>104</b>
Provision and access to PPE	46
Training (Chemical, first aid, machinery, OHS)	32
First aid kits, fire extinguishers/alarms, showers	13
Helmets	13
<b>Multiple Levels of Control – Elimination (1), Substitution (2) and Engineering (3)</b>	<b>114</b>
New or upgraded machinery and equipment	47
Pump maintenance or replacement with solar	5
Improved automation	4
Safer stockyards and stock handling procedures	42
Improved lifting and loading	16
<b>No changes made over past 12 months</b>	<b>11</b>
<b>Total changes</b>	<b>810</b>

### **Drivers of change**

The second free-text question, '*What prompted you to make these changes?*', attempted to ascertain the reasoning and drivers for the changes outlined in the previous section.

There were 467 drivers for change reported by 306 farm enterprises (91.3 per cent of all enterprises). The remaining 29 enterprises did not complete the section. The drivers for change were summarised into categories and sub-categories, and are reported in Table 2.

OHS requirements or legislation was the standout, most frequently reported response by participating farm enterprises (n=74), followed by increased safety awareness or consciousness (n=52), a general desire to improve safety and standards on their farm (n=42), the realisation or identification of a risk or hazard (n=39) and to gain improved efficiency or cost savings (n=21).

### **Discussion**

The media commonly report on farmers' negative perceptions of health and safety, legislation and hazards on their farm, but very little information has been reported about the 'good news' stories: that farmers are quietly making progressive and effective changes to their systems and management to improve health and safety.

The question asking enterprises about the changes they had made on their farms over the past 12 months provides the opportunity to analyse the current state of play of safety on Australian farms, rather than relying on anecdotes or general assumptions. These results will enable simple, cost effective and realistic changes to be promoted in farm health and safety interventions as solutions implemented by other farmers, as opposed to lower credibility recommendations made by researchers and work safety authority officials.

Of the 50 changes nominated by the farm enterprises, just six were *Hierarchy of Control* Level 1 controls (elimination), with the majority being Level 3 (engineering or isolating the hazard) and Level 4 controls (administrative controls). While this emphasis on lower responses in the Hierarchy is of concern from a risk-reduction perspective, it is not unexpected. Elimination of a hazard can be costly, time consuming or simply just not practicable or realistic, while administrative controls (systems, procedures, training and supervision) and the provision of PPE are generally both cost- and time-effective.

Of the 810 responses, almost half (n=384, 47.4 per cent) were related to changes to machinery or equipment. This was followed by changes to the farm environment (n=128, 15.8 per cent) and administrative and management changes (n=106, 13.1 per cent).

An analysis of the specific changes reveals that the most commonly reported change to health and safety was improvements to shearing shed safety. There were 175 enterprises that nominated that they were involved in sheep production, which therefore indicates that 33.1 per cent of sheep enterprises had made changes to their shearing shed safety in the past 12 months. The timing of the questionnaire followed the establishment of the NSW WorkCover *ShearSafe* program (WorkCover NSW, 2003b). The program involved seminars and financial incentives, with the seminars focusing on risk management, legislative responsibilities, shearing shed design, injury management and workers' compensation.

The second highest rating change was improvements to chemical handling and storage. This management change was expected to feature highly, due to OHS legislation regarding the storage of chemicals, provision of PPE and accredited training of chemical users.

The third most frequently reported change was the purchase of new machinery or the upgrading of existing machinery. New machinery is seen as a Level 1 change, while upgrading machinery can be a Level 1 to Level 3 change, depending on the technology and processes of the upgraded machinery.

Guarding, both generic and power take-off (PTO), featured prominently, with 21.8 per cent of enterprises making some form of change to guarding on their farms. This is most likely to be directly related to the rebate scheme offered by WorkCover NSW, which commenced in 2005. Additionally, Clause 136 (d) of the Occupational Health and Safety Regulation 2001 requires employers to control the risk of entanglement through guarding (WorkCover NSW, 2009).

**Table 2: Reported drivers of change**

<b>Driver for change</b>	<b>Frequency reported</b>
<b>Farm Management and Planning</b>	<b>164</b>
Desire to improve safety and standards	42
Realisation and identification of a risk or hazard	39
Improved efficiency or cost savings	21
To stop accidents occurring or to reduce overall risk	16
Improved management	14
Damaged or aged machinery and equipment	12
New machinery, equipment or techniques	12
Finances available to make changes	5
Long term planning	3
<b>Personal Motivations</b>	<b>133</b>
Increased safety awareness or consciousness	52
Experienced an injury, accident or near miss	20
Health, age, activity limitations	12
To reduce the risk of an accident or injury to self	11
Children living, working or visiting the farm	10
Commonsense	10
Concerns by and for family and friends	10
Time availability or lack thereof	4
Peace of mind	2
Recognition that risk doesn't have to be part of job	2
<b>Legislation, Insurance and Corporate</b>	<b>101</b>
OHS requirements and legislation	74
Risk of litigation	7
Certification or accreditation	6
Company policy or OHS committee	5
Rebate	4
External audit	3
Insurance requirements	2
<b>Training and Information</b>	<b>36</b>
Training, education or advisor	20
Health and safety in the media	11
Industry promotion or assistance	3
Field day	2
<b>Employees</b>	<b>22</b>
Employee/Contractor's input and comment	10
Observed employee practices	7
To retain or recruit staff	5
<b>Other</b>	<b>11</b>
Off farm employment experience	5
Supplier requirements	4
Drought enforced changes	2
<b>TOTAL</b>	<b>467</b>

The rebates available for PTOs and shearing handpieces and the extensive publicity resulting from the two schemes had a notable effect on the changes made on participating farm enterprises. However, rebates are perhaps the most costly initiative to governments and WorkCover authorities; the PTO rebate scheme cost WorkCover NSW \$1.1 million (WorkCover NSW, 2009), while the ShearSafe campaign cost them a further \$800,000 (WorkCover NSW, 2003a). An earlier scheme commencing in 2001, involving a rebate for the retrofitting of ROPS on tractors, resulted in around 10,000 successful applications, costing the government some \$2.0 million (WorkCover NSW, 2008).

WorkCover NSW (2003a) reported that, within the first year of launching the ROPS rebate in August 2000, there was a 29 per cent drop in serious tractor-related trauma incidents from the preceding nine-year average. The 78 incidents in 2000-01 represented the lowest number of incidents in the past decade. It is evident that an outlay of \$2 million on a rebate which so reduces the risk associated with this major hazard on farms will generate far greater economic savings to the economy through injury reduction, as tractor fatalities alone cost the economy \$86.7 million over 2001–04 (Pollock, 2010).

A greater understanding of why farmers are making changes to farm health and safety management and systems offers considerable insight to those working in the field of farm safety initiatives and promotion, enabling them to review why strategies have been successful or not, and to identify previously unrecognised motivators for instigating change.

Unsurprisingly, legislation and OHS requirements were the primary motivation for change. However, there were 36 drivers of change reported in total, with 467 responses. An encouraging aspect of this finding for those working in farm health and safety intervention is that farmers are thinking beyond the 'big stick' of regulation and penalties when it comes to the reasons for making changes on their farms.

A key sign that the advertising and promotion of farm health and safety is starting to have an impact is seen in the second, third and fourth highest responses: an increased safety awareness or consciousness; a desire to improve the safety and standards on their farm; and the realisation or recognition of a hazard.

The fifth most commonly reported motivator for change was to gain efficiency or cost savings, most commonly through new and upgraded machinery and improved automation. This finding, reported in several other studies (Australian Safety and Compensation Council, 2006; Durey and Lower, 2004; Murphy, 2003), is key to the success of future farm health and safety initiatives. If improvements to productivity and profitability can be clearly demonstrated by industry, farmers are likely to be more inclined to implement the recommendations into their farming system.

The notion that improvements to health and safety are a by-product of productivity gains can be used to challenge the widely held belief that changes to farm health and safety are 'too costly', as purchasing new or upgraded machinery was the third most commonly reported change to farm health and safety management or systems in the previous question. However, seasonal conditions and the challenging financial situation experienced by many farmers due to prolonged drought may make this approach unsuitable in some regions or industries.

Training and education appeared equal sixth on the list, which is a positive sign for the success of the Managing Farm Safety Courses that have been run through Farmsafe Australia. To have documented evidence that farmers are taking that additional step from attending the course to actually putting the lessons learned into practice on their farms is encouraging for the future success of the program.

## Conclusions

The ability to demonstrate changes to safety systems that are effective and cost- and time-efficient has been a key objective of this research. These changes need to be practical in their nature and seen to be realistic and cost-efficient by farmers. Therefore, the promotion of actual changes made by farmers, not just research or work safety authority recommendations, will improve the credibility and potential impacts of future farm safety initiatives.

These preliminary and now quite dated results reported here and in the companion paper (Pollock et al. 2014) suggest three areas for further investigation. First, it would be timely for a review of major hazards within the farming environment to identify risks (hazards associated with both fatal and non-fatal injury) that may be successfully eliminated or substantially reduced through adaptation or replacement and that may be subsidised by government or industry. Financial incentives do appear to cause changes that reduce farm safety risks. While the use of rebates is a significant cost, Pollock (2010) demonstrated that farm injury fatalities over 2001–04 cost the Australian economy approximately \$650 million. Any reduction in the number of farm-related fatalities or injuries through rebate incentives

will reduce the overall cost to the Australian economy. Therefore, there are good arguments that improving on-farm safety through the careful use of rebates will result in public good benefits that substantially outweigh any private good benefits associated with the rebate.

Second, while OHS legislation and compliance is not a popular driver among farmers, it does successfully bring about behavioural and practice change. But is it being applied in the most effective manner? Are there modifications that can be made to legislation that can make compliance more straightforward for the farmer? Are the regulations sensible, practical and realistic? How does legislation link with the major hazards identified as priorities by Farmsafe Australia? Are the standards required for low level hazards and risks too burdensome? Could high level risks be better managed and controlled? A review of OHS legislation that addresses these questions should be undertaken to determine if further reductions in farm injury and death could be achieved by increasing practicality, relevance and ease of compliance.

Finally, it would be beneficial to undertake some detailed analysis of the potential efficiency, production and financial gains that can be achieved through improvements in farm safety. Once reliable estimates have been established, these can become case study promotions in future campaigns. The linkage between farm safety and production efficiency is already firmly in the mind of many farmers and a demonstrable reason for them making changes to health and safety on their farms. Future initiatives need to capitalise on this momentum, and further educate farmers on the economic benefits associated with an increased focus on farm safety and improvement.

## References

Australian Safety and Compensation Council (2006), *Beyond Common Sense - A report on the barriers to adoption of safety in the agriculture industry*, Australian Safety and Compensation Council, Canberra.

Day, L. and Stathakis, V. (2004), *Evaluation of Farm Injury Prevention Programs: A report for the Rural Industries Research and Development Corporation*, 03/139, Monash University Accident Research Centre, Melbourne.

Durey, A. and Lower, T. (2004), "The culture of safety on Australian farms", *Rural Society* 14, 57-69.

Fragar, L., Temperley, J., Depczynski, J. and Pollock, K. (2009), *Achieving Safety Change on Australian Farms: Using new and established pathways to improve adoption. A Report for the Rural Industries Research and Development Corporation*, Australian Centre for Agricultural Health and Safety, Moree.

Haddon Jr, W. (1973), "Energy damage and the ten countermeasure strategies", *Journal of Trauma* 13, 321-331.

Murphy, D.J., Kiernan, N.E. and Chapman, L.J. (1996), "An occupational health and safety intervention research agenda for production agriculture: does safety education work?", *American Journal of Industrial Medicine* 29, 392-396.

New South Wales Government (2001), *Occupational Health and Safety Regulation 2001*, NSW Government, Sydney.

Pollock, K.S. (2010), *The economic cost of farm-related fatalities and the perceptions and management of health and safety on Australian farms*, PhD thesis, University of Sydney.

Pollock, K., Fragar, L. And Griffith, G. (2014), "Occupational health and safety on Australian farms: 1. Farmers' perceptions of major hazards", *Australian Farm and Business Management Journal* (this issue).

Pollock, K., Fragar, L. and Temperley, J. (2008), *The Australian Farm Safety Study, A Report for the Rural Industries Research and Development Corporation*, Australian Centre for Agricultural Health and Safety, Moree.

Sandall, J. and Reeve, I. (2000), *New Ways of Promoting Farm Health & Safety: Through analysing farmers' perceptions of risk, A report for the Rural Industries Research and Development Corporation*, 00/138, University of New England, Armidale.

Stavea, C., Törner, M. and Eklöf, M. (2007), "An intervention method for occupational safety in farming — evaluation of the effect and process", *Applied Ergonomics* 38, 357-368.

WorkCover NSW (2003a), *Annual Report 2002-2003*, Workcover NSW, Sydney.

WorkCover NSW (2003b), "Safety in the sheep shearing industry", *WorkCover News* 53, 4-5.

WorkCover NSW (2008), *Workplace Safety Summit Achievements 2003*, WorkCover NSW, Sydney.

WorkCover NSW (2009), *Tractor Power Take-off Rebate Program*, WorkCover NSW, Sydney.