2008/313 Collaborative partnership for farming and fishing health and safety

PRINCIPAL INVESTIGATOR: Rural Industries R&D Corporation
ADDRESS: University of Southport
Phone: 02 6271 4100
Level 2, 15 National Circuit, Barton ACT 2600

OBJECTIVES:

1. To improve the physical health of farming and fishing workers and their families
2. To improve the mental health of farming and fishing families
3. To improve the safety environment and work practices in farming and fishing industries.

NON TECHNICAL SUMMARY:

OUTCOMES ACHIEVED TO DATE

The Collaborative partnership for farming and fishing health and safety is funded by RIRDC, the Australian Government Department of Health and Ageing, Grains Research and Development Corporation, Fisheries Research and Development Corporation, Sugar Research and Development Corporation and Cotton Research and Development Corporation.

The key target audiences for health and safety information are business owners, managers and employees, who with their families live on Australian farms and in fishing communities.

Improvement in the physical and mental well-being of these groups resulting from investment in RD&E is the key outcome of the Program. The Program has also improved consultation and communication with health professionals and researchers working in the field of rural health and safety.

Thirty projects have been completed (listed below).

The program was evaluated through benefit cost analysis in 2011. Three projects were randomly selected and analysed. The analyses found all three investments provided positive returns with individual benefit-cost ratios ranging from 2.2 to 5.6.
As only 3projects out of a population of 17projects were analysed, these results cannot be used to infer anything about the likely range of results for the population of projects as a whole.

In 2012-13, the partnership will be re-established with additional partners sought. A new R&D plan for the partnership will be developed to provide direction as the partnership continues.

Completed projects under the partnership:

- Testing and delivering media communication strategies for child safety on f
- Sustainable Farm Families - Future Directions
- Staying healthy: Behaviours and services used by farmers and fishers
- Next Steps Forward for Farming & Fishing Health & Safety
- National farm injury data project - continuation
- Farm safety studies
- Effectiveness of risk control measures to reduce occupational exposure to p
- Interventions for best practice health and safety behaviour change - Stage 1
- Safe Farming on Small Farms
- Evaluation and development of Farm Health and Safety Toolkit for Rural GPs
- Health & Safety Baseline of Australian Farm Enterprises
- OH&S Practices on Australian Farms
- Collaborative Partnership for FFH&S Future Projects Workshop
- National Centre for Farmer Health Conference - 11-13 October 2010
- OH&S Baseline data survey of Australian Fishing Industry
- Drug and Alcohol use by farming and fishing workers
- 11th National Rural Health Conference March 2011
- redraft of select Tender Call for the FFHS Fisheries OHS status
- Farming Fishing Health and Safety Communications Strategy
- Marine Safety Conference 2010:
- BCA for FFHS Program (10/11)
- Farm & Fishing Research Compendium
- Scoping Data Requirements for the Fishing Industry
- Capacity building of rural & remote communities to manage their mental health
- Sustainable farming families - building and extending our future
- Developing an RDE plan for potential co-investment by partners in a Collaborative partnership
- In-depth investigations of farm machinery injury
- Farming and Fishing Health and Safety Workshop Catering
- 10th Annual National Rural Health Conference May 2009
- 10th Annual Rural Health Conference Booth

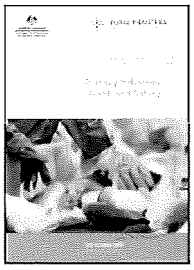
ATTACHMENTS:

1. List of published reports from the collaborative partnership program
2. Farm Health and Safety Research Compendium 2009
3. Completed projects 2009-10 and research in progress as at June 2010
4. Completed projects 2010-11 and research in progress as at June 2011
5. Economic Evaluation of Investment in the Farming & Fishing Health & Safety R&D Program

KEYWORDS: safety, health, partnership, mental health

Attachment 1: List of published reports from the collaborative partnership program

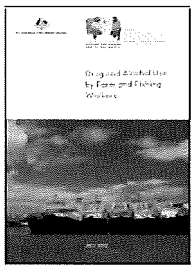
Farming & Fishing Health & Safety



Research in Progress 2011-1012 Primary Industries Health and Safety

$0.00
RIRDC

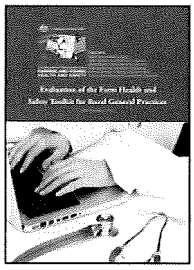
The Primary Industries Health and Safety Program Completed Projects 2011-12 and Research in Progress at June 2012 contains short summaries of projects funded by the Program. The Program..



Drug and Alcohol Use by Farm and Fishing Workers

$25.00
Julaine Allan, Peter Meister, Anton Clifford, Kerri Whittenbury

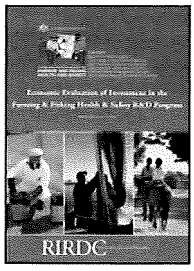
This Rural Industries R&D Corporation study collected qualitative and quantitative data to describe farm and fishing workers' use of drugs and alcohol, their understanding of drug a...



Evaluation of the Farm Health Safety Toolkit for Rural General Practices

$25.00
Frances Boreland, David Perkins

Australian farmers have higher rates of death from certain cancers, and higher incidence of cardiovascular disease, suicide and avoidable injury than other Australians, but poorer access to h...

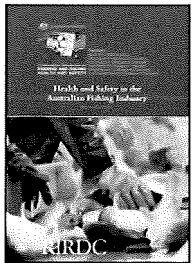


Economic Evaluation of Investment in the Farming and Fishing Health and Safety Program

$25.00
Jessica Lai, Dr Peter Chudleigh, Sarah Simpson

This RIRDC report presents the results of economic analyses of three investments within the Farming & Fishing Health & Safety Program.

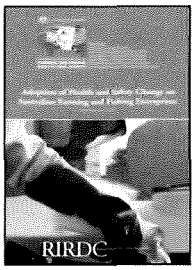
The information contained in the repo...



Health and Safety in the Australian Fishing Industry

$35.00
Dr Kate Brooks

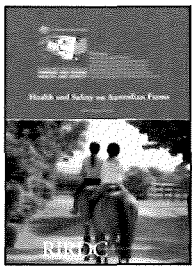
This report is the result of the identification of gaps in occupation health and safety (OHS) data for the fishing industry by the Collaborative Partnership for Farming and Fishing Health and...



Adoption of Health and Safety Change on Australian Farming and Fishing Enterprises

$25.00
Lyn Fragar, Tony Lower , John Temperley

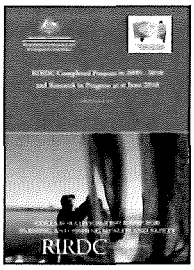
Over several years there has been considerable investment in defining and analysing causal factors associated with common hazards of high risk on farms, plus the development of guidelines to ...



Health and Safety on Australian Farms

$25.00
Tony Lower , Lyn Fragar, John Temperley

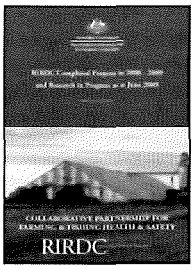
This report provides for the first time in Australia, national baseline data to determine the proportion of farming enterprises, by specific industry and by state, that have in place systems ...



Research in Progress - Collaborative Partnership for Farming and Fishing Health and Safety 2009-10

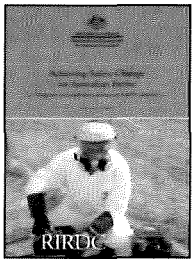
$0.00
RIRDC

The Collaborative Partnership for Farming and Fishing Health and Safety Research in Progress June 2010 contains short summaries of continuing projects as well as those that were completed dur...



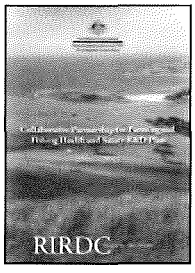
Research in Progress - Farming, Fishing Health &Safety

$0.00
RIRDC
The Collaborative Partnership for Farming and Fishing Health and Safety Completed Projects in 2008- 2009 and Research in Progress at June 2009, contains short summaries of continuing projects as ...



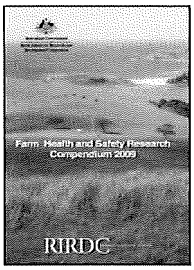
Achieving Safety Change on Australian Farms - using new and established pathways to improve adoption

$25.00
Lyn Fragar, John Temperley, Julie Depczynski, Kirrily Pollock
This research report is about factors that will improve adoption of safety practice and systems on Australian farms. The review describes approaches and evaluation reports of Australian farm safety...



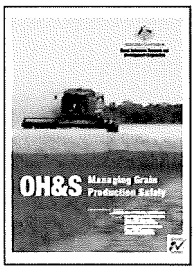
Collaborative Partnership for Farming & Fishing Health & Safety R&D Plan

$0.00
RIRDC
This plan is the first for the Farming and Fishing Health and Safety Program, and builds on the work undertaken for the Farm Health and Safety Program. It was developed following consultation with ...



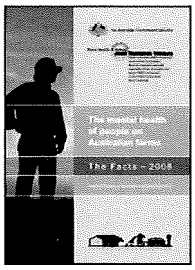
Farm health and Safety Research Compendium 2009

$25.00
Michael Clarke
This RIRDC publication reflects the major research themes associated with the Collaborative Partnership for Farming and Fishing Health and Safety R&D Plan 2008-2012. These include farm safety and t..



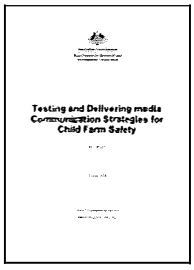
OH&S Managing Grain Production Safely

$35.00
Farmsafe Australia Grain Production Reference Group
This package contains safety guidelines and manuals that provide a practical guideline for grain producers, managers and workers to improve and ensure the safety of those who work with grain produc...



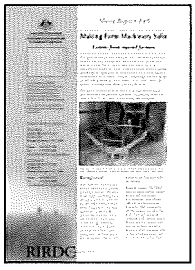
The Mental Health of People on Australian Farms - The Facts.

$5.00
Fragar L, Henderson A, Morton C, , Pollock K.
This chartbook provides available relevant data relating to the mental health and wellbeing of the people in agriculture - the changing structure of family farms, the ageing profile of farmers an...



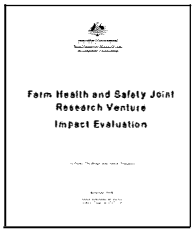
Testing and Delivering Media Communication Strategies for Child Farm Safety

$25.00
Lia Bryant
Media reports continue to remind us that children die or are seriously injured on farms. Farmsafe Australia has provided a comprehensive campaign for raising community awareness and education with ...



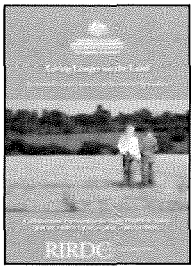
Making Farm Machinery Safer - Lessons from injured farmers

$0.00
Wayne Baker, Lesley Day
This report focuses on farm machinery injury. The work reported here identifies individual and machine characteristics that are associated with an increased risk of a serious farm work related inju...



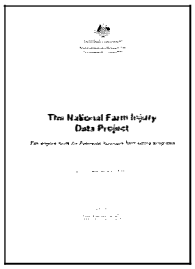
Farm Health and Safety Joint Research Venture - Impact Evaluation

$25.00
Peter Chudleigh, Sarah Simpson
The report summarises and evaluates the effectiveness of research funded by the Joint Research Venture for Farm Health and Safety (2001-2006). The report is aimed at institutional investors in ...



Living longer on the land: Sustainable Farm Families in Broadacre Agriculture

$35.00
S Brumby, B Wilson, S Willder
The current health of all Australians is an important ongoing political priority and significant resources have been allocated to determine the current health status and the needs of both metropoli..



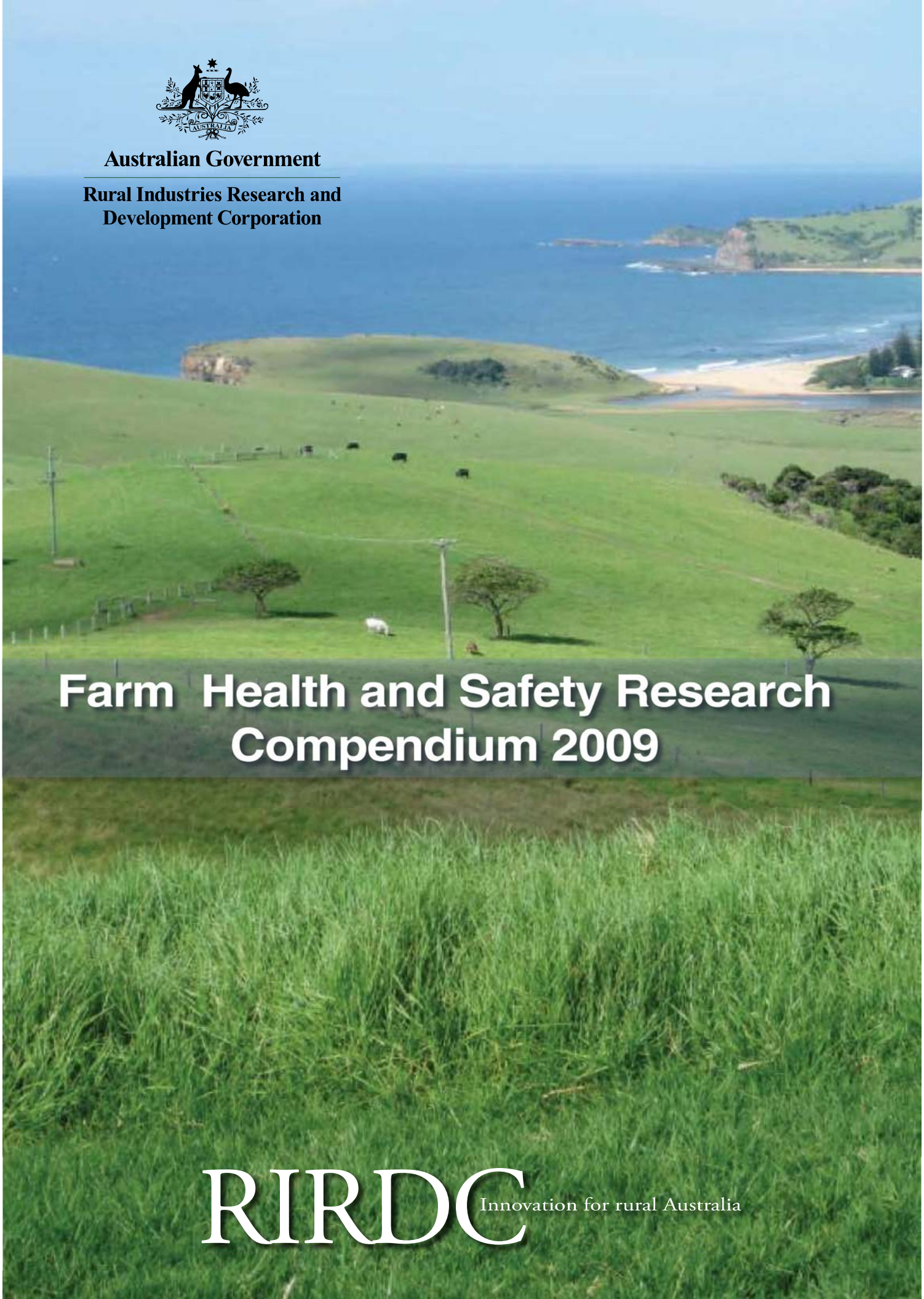
The National Farm Injury Data Project: The engine room for Farm safety programs

$25.00
Lyn Fragar, Kirrily Pollock
Accurate and timely data relating to farm, injury and illness is needed to provide industry and injury practitioners with information to prevent injuries. Recently, there has been recognition of th...

Making Farm Machinery Safer - lessons from injured farmers

$25.00
Wayne Baker, Lesley Day, Karen Stephen, Don Voakla
This report complements the recent series of reports on farm injury by the Australian Centre for Agricultural Health and Safety (Farm Machinery Injury: Injury involving tractor run-over, Farm Machi...

These reports can be found at: www.agrifutures.com.au/publications-resources/publications/



Australian Government

Rural Industries Research and Development Corporation

Farm Health and Safety Research Compendium 2009

RIRDC

Innovation for rural Australia

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ISSN 1440-6845

Farm Health and Safety Research Compendium 2009

Publication No. 09/065
Project No. PRJ-004532

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Australian Government

Rural Industries Research and Development Corporation

Farm Health and Safety Research Compendium 2009

by Michael Clarke

RIRDC Publication No 09/065

May 2009

Acknowledgments

The Plan's authors wish to acknowledge the assistance of RIRDC and the researchers with their review of draft research summaries.

Abbreviations

APVMA	Australian Pesticides and Veterinary Medicines Authority
ATV	All Terrain Vehicle
AWI	Australian Wool Innovation
CRDC	Cotton Research and Development Corporation
DA	Dairy Australia
FRDC	Fisheries Research and Development Corporation
GRDC	Grains Research and Development Corporation
HAL	Horticulture Australia Limited
MLA	Meat and Livestock Australia
MSDSs	Material Safety Data Sheets
OH&S	Occupational Health & Safety
OP	Organophosphate
PPE	Personal Protective Equipment
PTO	Power Take Off
ROPS	Roll Over Protective Structures
RIRDC	Rural Industries Research and Development Corporation
SFF	Sustainable Farm Families
SRDC	Sugar Research and Development Corporation

Foreword

Effective communication of research results enhances adoption and ensures the best returns from investment in research and development (R&D).

In selecting R&D projects for the new Farming and Fishing Health and Safety Collaborative Partnership 2009-2012, a wide range of concerned stakeholders were consulted. Projects identified as a result of this process included a 'plain English' compendium of recent research and this document is a result of that request. It outlines the valuable work completed by the Joint Venture in Farm Health and Safety between 2002 and 2008 and is an important tool in the dissemination of research results.

The Joint Venture in Farm Health and Safety was supported by R&D corporations – Rural Industries Research and Development Corporation (RIRDC), Grains Research and Development Corporation (GRDC), Meat and Livestock Australia (MLA), Australian Wool Innovation (AWI), Cotton Research and Development Corporation (CRDC), Sugar Research and Development Corporation (SRDC), Dairy Australia (DA) and Horticulture Australia Limited (HAL). The successor program includes Fisheries Research and Development Corporation (FRDC).

The compendium reflects the major research themes associated with the Collaborative Partnership for Farming and Fishing Health and Safety R&D Plan 2008-2012. These include farm safety and the physical and mental health of farm and fishing families.

The compendium provides easy to read information to assist farmers and their service providers understand the purpose of the research completed by the program, the outcomes of each project, communication of results, the research implications for industry, the key benefits and how to contact the researchers to access further information.

Research and development is pointless on its own unless it is communicated convincingly to a receptive audience of those who are actively engaged in primary production. It is for this reason that the compendium has been produced.

This report, a new addition to RIRDC's diverse range of over 2,000 research publications, forms part of our Rural People and Issues Portfolio whose goal is to:

Enhance human capital and facilitate innovation in rural industries and communities.

Most of RIRDC's publications are available for viewing, downloading or purchasing online at www.rirdc.gov.au. Purchases can also be made by phoning 1300 634 313.

Peter O'Brien
Managing Director
Rural Industries Research and Development Corporation

Introduction

The objective of the RIRDC Farming and Fishing Health and Safety R&D Program is to improve the health and safety of workers and their families in the farming and fishing industries across Australia

In February 2009 RIRDC convened a Farming and Fishing Health and Safety Collaborative Partnership workshop. The workshop was attended by:

- Members of the program advisory and technical committees
- Industry representatives
- Public health professionals
- Health and safety professionals
- Academics

The purpose of the workshop was to collaborate and agree on a portfolio of research projects of relevance to the Collaborative Partnership for investment between 2009 and 2012.

The Collaborative Partnership for Farming and Fishing Health and Safety R&D Plan 2009 to 2012's objectives address the:

- Physical health of farming and fishing workers and their families
- Mental health of farming and fishing families
- Safety environment and work practices in farming and fishing industries

One project to emerge from the workshop and plan development process was a request for a 'plain English' compendium of Collaborative Partnership funded farm health and safety research completed between 2002 and 2008. The compendium was to increase effective communication of research outcomes amongst industry players. This document is the resultant research compendium.

Compendium research summarises are presented in the following order:

- Australian farm health and safety in overview
- Protecting vulnerable farm persons
- Addressing specific farm hazards
- Industry specific farm health and safety risks and responses
- Policy, planning and future research

Most projects address farm safety issues.

Farm Health and Safety in Overview

Tractors continue to be the most reported cause of unintentional farm related fatalities, remaining significantly higher than the second most frequent cause of death

In Brief

- The report summarises currently available data on deaths relating to agricultural production in Australia
- The major causes of non-intentional farm related death are tractors, all terrain vehicles (ATVs) and drowning. Horse related deaths have declined
- This project informs future farm health and safety R&D and frames much of the research report summaries to follow in this compendium

Why the Research was Completed

The research was completed to:

- Define key hazards associated with agricultural production in Australia
- Define program needs for agricultural industries throughout Australia
- Develop effective health and safety programs that address key risks

Results Achieved

Tractors continue to be the most reported cause of unintentional farm related fatalities, remaining significantly higher than the second most frequent cause of death.

Farm vehicles continue to remain prominent causes of death and injury. However, this study sees the emergence of ATVs as a key cause of fatalities. During a similar study completed between 1989 and 1992, there were only four recorded ATV fatalities. This figure has significantly increased to 51 over the 2000–04 period and reflects the increasing use of ATVs on farms in Australia.

While dam drowning remains high, the number of horse-related deaths has declined.

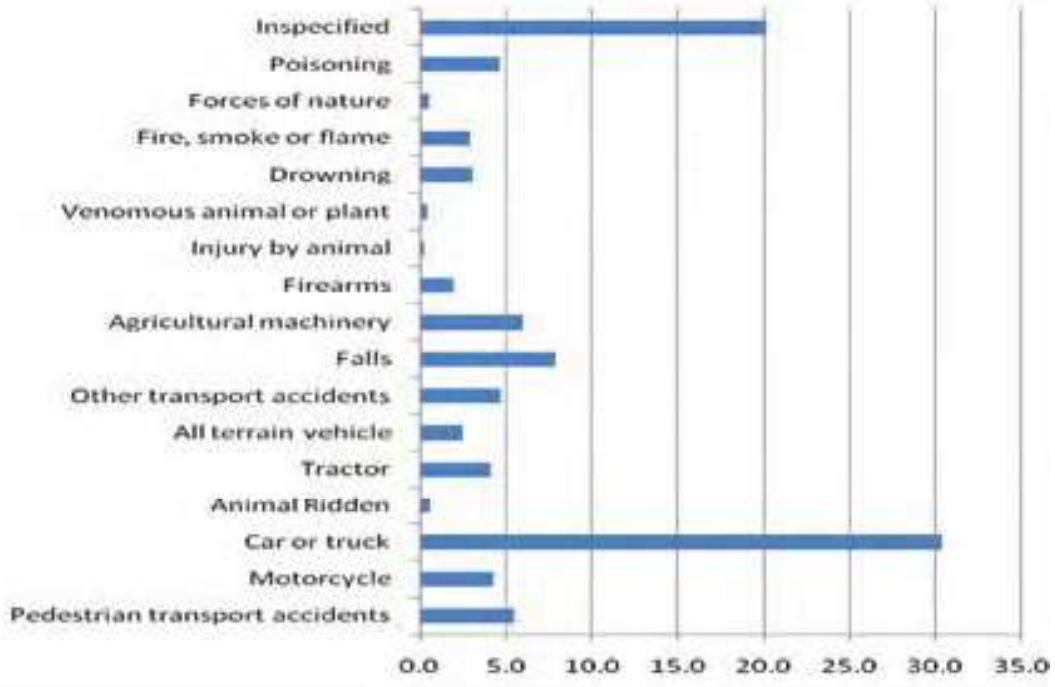
The table below provides summary data for agent of fatality for farmers both on and off farm. Percentage data is skewed toward off farm fatal car accidents.

Benefits for Farmers

This document summarises all current fatalities data available to the National Farm Injury Data Centre. It has been produced to provide guidance to agencies and individuals working to reduce risk associated with living and working on farms in Australia. The publication is available electronically for use by educators and those whose role is the development of public and industry policy to improve safety.

The reports authors recommend that the research be used to provide guidance to agencies and individuals working to reduce serious injuries and deaths on Australian farms.

Agent of fatality for farmers/farm managers and agricultural labourers/related workers, Australia 1999–2002



Further Information

The project was completed in 2007. It will be used to guide future Farming and Fishing Collaborative R&D.

Further information on the project is available from the RIRDC website (https://www.rirdc.gov.au) or by contacting Associate Professor Lyn Fragar at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-141A 'Traumatic Deaths in Australian Agriculture – The Facts'

Key Publication:

Traumatic Deaths in Australian Agriculture – The Facts 2007

Contact:

Associate Professor Lyn Fragar
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

Farm vehicles continue to remain prominent causes of death and injury

2. Injury on New South Wales Farms – The Facts 2005

Poultry farm at Tamworth New South Wales

In Brief

- New South Wales is Australia's most populous state. Approximately 86,835 people or 1.3% of the population are employed in agriculture and services to agriculture. There are currently 41,651 farming establishments
- The three most common types of agricultural establishment in New South Wales are beef cattle farming, grain/sheep/cattle farming and sheep farming
- Dairy and especially poultry farming would appear to have a higher than proportional share of New South Wales farm injuries

Why the Research was Completed

The research was completed to:

- Help define the key occupational health and safety (OH&S) risks and program needs for specific agricultural industries in New South Wales
- Help define the key OH&S risks that are generic across all key agricultural industries in New South Wales
- Develop effective health and safety programs that address key risks

Results Achieved

In New South Wales there are around 3,000 workers' compensation claims made each year for injury across all agricultural industries. The majority of claims are made by workers in the grain/sheep/beef cattle farming industries – one of the most common forms of agricultural establishment (see table opposite).

The chart on the next page shows the incidence of claims for each New South Wales agricultural industry against all industry, demonstrating that the number of claims submitted per 1,000 workers for each agricultural industry is higher than the sum of all industry.

Dairy and especially poultry farming would appear to have a higher than proportional share of New South Wales farm injuries.

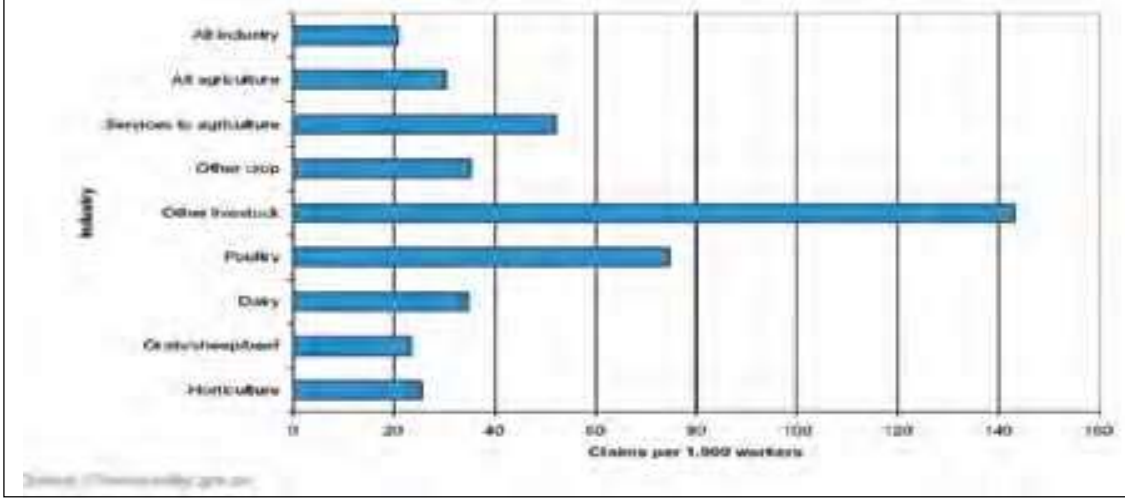
Benefits for Farmers

This research has been prepared to provide guidance to those agencies and individuals who are working to reduce risk associated with living and working on farms in New South Wales. The publication is available electronically for use by educators and speakers in their efforts to raise awareness and promote farm safety.

Numbers of workers' claims by industry, New South Wales 1992-93 to 2000–01

Industry	No. of claims	Male:female ratio	Average per annum	Percentage of all claims
Horticulture and fruit growing	3,951	3:1	439	14
Grain, sheep and beef cattle farming	9,631	17:1	1,070	35
Dairy cattle farming	1,853	1:1.3	206	7
Poultry farming	4,796	1.6:1	533	18
Other livestock farming	2,365	5.3:1	263	9
Other crop farming	1,755	5:1	195	6
Services to agriculture	3,390	8:1	377	11
Total	27,741		2,693	100

Incidence of workers' claims for various agricultural industries and all industry, New South Wales 2002



Further Information

The project was completed in 2005. Further information on the project is available from the RIRDC website (https://www.rirdc.gov.au) or by contacting Associate Professor Lyn Fragar at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-121A 'Injury on Farms in New South Wales'

Key Publication:

Farms in New South Wales – The Facts 2005

Contact:

Associate Professor Lyn Fragar
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

The majority of claims are made by workers in the grain/sheep/beef cattle farming industries

3. Evaluation of Farm Injury Prevention in Victoria and Queensland 1998-2001

In Brief

This report provides foundation information for the monitoring of farm injury prevention in Victoria. It also provides a broader comparison of farm injury prevention program uptake and outcomes in Victoria and Queensland in an attempt to provide some insight to successful approaches to farm health and safety.

Why the Research was Completed

Monitoring and evaluation of farm health and safety programs is important for improving health outcomes for farmers, farm workers and their families. The research was therefore completed to compare the impact of differing approaches to farm injury prevention in Victoria and Queensland.

This project was undertaken to monitor changes to farm safety practices and behaviour, and injury rates, in Victoria to support state-wide and regional programs. As similar monitoring has also been occurring in Queensland, results were compared between the two states.

The researchers were Lesley Day and Voula Stathakis from the Monash University Accident Research Centre.

Results Achieved

The key organisations involved in farm safety, and the major farm safety strategies, were similar in both states. The use of legislation in Queensland to create an environment for change was somewhat different to Victoria where legislation actually required change and was coupled with enforcement. During the 1990s, implementation in Victoria tended to focus on single key issues while in Queensland, a broader focus was taken.

There were relatively small improvements in some farm safety factors in Victoria over the three year period (1998-2001). These were coupled with 14% reduction in the serious injury rate from 8.5 to 7.3 per 100,000 hours worked. A range of factors were associated with taking at least one safety related action, over the previous 12 months, and with at least average farm safety behaviour performance. Among the four major commodity groups in Victoria, the dairy group showed statistically significant improvements across the largest number of variables measured. Rates of serious injury per 100,000 hours worked decreased by 5% and 4% for dairy and beef cattle respectively, and by 1% for cereal grains.

In 1998, Queensland and Victorian farms differed on various farm safety factors, each having stronger performance on different factors, some of which could not be explained by the different commodity mix in the two states. The serious work-related injury rate per 100,000 hours worked for all farms was significantly higher in Victoria (8.5) than in Queensland (3.1). This was somewhat surprising given that

Child safety is a cornerstone of farm injury prevention in both Victoria and Queensland

the comparison of safety performance did not show dramatic differences. The higher injury rate was also apparent across the four major commodity groups.

A number of methodological issues were identified which require addressing to improve future monitoring of the uptake of farm safety practices and injury rates.

Benefits for Farmers

Recommendations for farm safety programs in Victoria were made as a result of this research, which if implemented by the Victorian WorkCover Authority, should improve efficiency and effectiveness.

Further Information

The project was completed in 2003.

Further information on the project is available from the RIRDC website (https://www.rirdc.gov.au) or by contacting Dr Lesley Day at Monash University.

RIRDC Project:

UMO-22A 'Evaluation of Farm Injury Prevention in Victoria 1998-2001'

Resultant Publications and Communication:

- Paper delivered to the Fifth National Conference on Injury Prevention and Control, Warrnambool, Victoria, Australia, 2001
- Paper titled *'Monitoring of Farm Safety Practices and Injury Rates in Victoria'*

Contact:

Dr Lesley Day
Monash University Accident Research Centre.
Phone: 03 9905 1811
Email: Lesley.day@muarc.monash.edu.au

4. Rural Health & Safety Intervention in the South West of Western Australia

In Brief

- Farmers are not motivated to attend rural health and safety training
- Alternative, preferably cooperative, approaches must be identified
- The final report from this project was titled *"Safety Promotion – A Tale of Lost Opportunities'*

Why the Research was Completed

Despite significant statistics on fatality and injury rates, there is a low rate of adoption of farm safety practices and farm safety remains a low priority for most farmers.

Previous reports have highlighted the need for studies that more directly investigate measures that increase the proportion of farmers who take advantage of programs such as Managing Farm Safety.

It is in this context that a safety promotion initiative was proposed for the South West of Western Australia (2001-2002) with the objectives of:

- Raising the awareness in the agricultural community of farm safety issues, through conducting a brief community educational program, delivered by Farmsafe Western Australia (WA)
- Making an assessment of farm risk profiles and specific hazards
- Making recommendations to effect education, training and support strategies that increase the proportion of farmers who take advantage of programs such as Managing Farm Safety

Results Achieved

The extent of susceptibility to injury with 26 to 40 major injuries per 100 farms per year, confirmed the need for safety promotion programs to increase the proportion of farmers who take advantage of safety courses

Sixty percent of injured farmers stopped work with an average of seven days of lost productivity, 63% being treated by a doctor and 12% requiring a short stay in hospital. Ninety percent of injured people were male with a median age of 40 years.

The lack of awareness of the role, functions and courses of Farmsafe WA (only 7% were very aware of the course) and the confusion of the organisation with Worksafe WA undermined the success of the brief education presentations. Worksafe WA is seen as a disciplinary organisation and only 17% of farmers were very aware of the differences between the two bodies. The low levels of awareness were coupled with low levels of motivation to seek further information on the Managing Farm Safety course. There was a general feeling of resentment that farmers were swamped with courses often useless and by an influx of new invasive regulations, which have not proved to be a good match to the highly valued 'common sense'.

Benefits for Farmers

The study highlighted many barriers that impacted on farmers' uptake of safety initiatives and therefore lost opportunities to progress the adoption of safe practices in the South West of WA. It indicated that over three-quarters of farmers were still at the pre-contemplation stage, with no intention to initiate changes or attend the course and only 10% were highly motivated. Drawing on the experience of initiatives focussed on men in the health field, the course probably needs to be redesigned to appeal to men's learning style which is more skill-based, more topic-focussed and one that requires delivering 'soon and certain' outcomes.

Further Information

The project was completed in July 2003.

Further information on the project is available from the RIRDC website (https://www.rirdc.gov.au) or by contacting Professor Samar Aoun at the WA Centre for Cancer and Palliative Care, Curtin University.

RIRDC Project:

WAC-2A 'Rural health and safety intervention for the Agricultural sector in the South West of WA'

Key Publication:

An article has been submitted to the Journal of Rural Society for consideration for publication. The final report was titled *'Safety Promotion – A Tale of Lost Opportunities'*

The article *'Farm Safety Promotion in the Context of Health Promotion" Lessons Learnt on Rural WA'* was published in 2004 in the online journal, The International Journal of Rural Psychology.

Contact:

Professor Samar Aoun
WA Centre for Cancer and Palliative Care,
Curtin University
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PERTH WA 6845
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5. Ute Guide to OH&S for Broadacre Agriculture

In Brief

- The development of this OH&S guide has resulted from the identification of the need for a user-friendly, portable reference that agricultural workers can apply in their day to day operations
- The ute guide addresses the goal of increasing the adoption of safe systems of work on farms

Why the Research was Completed

Statistics show that farming businesses are amongst the most dangerous Australian workplaces, hence the importance of improved OH&S practices.

Management of health and safety risk is a confusing and frustrating task for many farmers. Key concerns relate to their liability, responsibilities under the relevant OH&S legislation, protection of family members and employees and the cost of addressing hazards and risks.

Whether self-employed (family property), employer, or contractor, there is a legal 'duty of care' responsibility to ensure a safe farm workplace is provided. Farms are businesses and are treated accordingly by respective state OH&S legislation. The ute OH&S guide is a quick reference for broadacre agriculture. It has been developed as a result of the need for a user-friendly, portable reference that agricultural workers can use in their day to day operations.

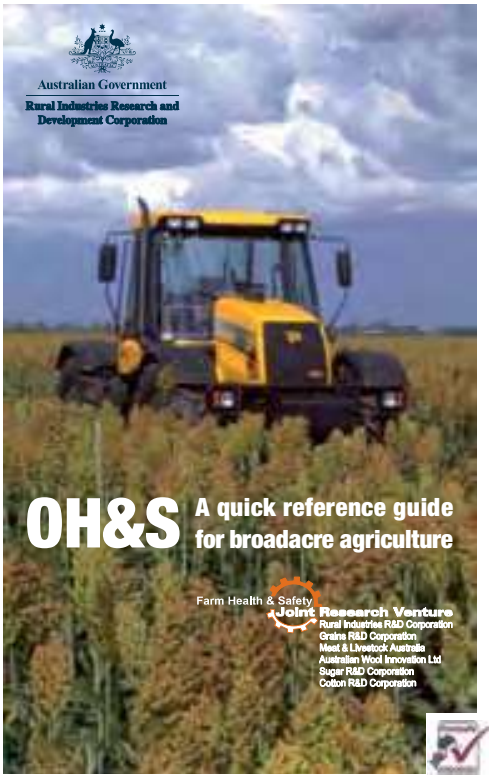
OH&S literature relevant to agriculture is plentiful, however it is consistent with office desktop or non-portable based formats such as pamphlets, brochures, A4 handbooks, A4 folders or electronic bulletins. Whilst this information is beneficial for training purposes and as part of the business OH&S policy, it may not be readily accessible to all agricultural workers in the business and at the time of undertaking a hazardous task.

Accordingly, the *'OH&S: A quick reference guide for broadacre agriculture'* was produced to:

- Fill the need for more accessible tools to assist with the understanding and application of OH&S
- Provide Health & Safety reference material accessible at the point of implementation in the day to day operations of farms

Results Achieved

Publication of the *'OH&S: A quick reference guide for broadacre agriculture'* will provide advice to farmers, employees and contractors on best practice standards and OH&S legislation governing generic tasks commonly performed in broadacre agriculture.



This free RIRDC publication provides people in the agricultural workplace with a clear, accessible reference on how to carry out operations in accordance with OH&S guidelines and industry best practice. The aim is to lessen the risk of injury to people in the agricultural workplace and reduce incidents with environmental impacts such as chemical spills. It will also provide a simple tool to support Job Safety Analysis (JSA) and Risk Assessments in the workplace and promote best practice health and safety performance to agricultural businesses and foster a culture of 'beyond compliance'. (RIRDC Pub. No. 06/111, 98 pages, free).

Benefits for Farmers

The benefits of the ute guide for farmers, their employees and their contractors include:

- Providing people in the agricultural workplace with a clear, accessible reference on how to safely carry out operations in accordance with OH&S guidelines and industry best practice
- Lessening the risk of injury to people in the agricultural workplace
- Reducing the risk of environmental impact incidents such as chemical spills through safe management of agricultural chemicals
- Providing a simple tool to support Job Safety Analysis (JSA) and Risk Assessments in the workplace.
- Promoting best practice health and safety performance to agricultural businesses and fostering a culture of 'beyond compliance'

Further Information

The project was completed in 2007 by Phil O'Callaghan, Frank Delahunty and Gaynor Baker.

Further information on the project is available from the RIRDC website or by contacting Phil O'Callaghan at O'Callaghan Rural Management and DIRT Management.

RIRDC Project:

ORM-1A: 'Ute guide to OH&S for broadacre agriculture'

Contact:

Phil O'Callaghan at O'Callaghan Rural Management and DIRT Management
Phone: 03 5441 6176
Email: admin@orm.com.au

The farm environment is rich in potential OH&S hazards

6. Sustainable Farm Families: Living Longer on the Land

"The farm isn't the paddocks and the crops and the machinery, the farm is you. And without you, the farm isn't worth anything."

In Brief

The current health of all Australians is an important ongoing political priority and significant resources have been allocated to determine the current health status and the needs of both metropolitan and rural/remote populations. Data reveals that the health status of rural populations is poorer than their city counterparts (ABS 2000). However, there is an insufficient understanding of the specific health statistics of rural *farming* populations.

Funding was therefore provided to undertake a Sustainable Farm Families (SFF) program to investigate the state of broadacre farmer health in Victoria, southern New South Wales and eastern South Australia for a period of three years and to run structured education programs over the three years.

This report provides a glimpse of the current health status of rural farming families. It increases our understanding of what affects farming families' health and identifies measures to improve their health, well-being and safety. Many of the specific strategies to improve farming family health were provided by farmers themselves.

Why the Research was Completed

The SFF project was developed in response to evidence that little is known about the health status of farming families (men, women and extended families). While there are health statistics regarding rural and metropolitan health there is little empirical evidence of the status of farming families.

The goal was to develop and trial a program that enabled farmers to increase their control over and improve their health, well-being and safety.

Results Achieved

Over 128 farming family members were actively recruited by the Western District Health Service and its collaborative partners to participate in the SFF program where they were monitored and educated over a three year period. Data gathered to address key research questions has enabled the identification of health and well-being factors that directly effect rural farming families.

Farming families have embraced this research and are incorporating health as an important business indicator that affects their 'triple bottom line'. The results indicate an overall improvement in the health of the farming family member during this time. The SPP has grown in its capacity and has been extended to other agricultural industries to test its transferability and to further investigate the health of farming families.

The SFF project has achieved some very important outcomes and research findings. These include:

- High retention rates of farming families over the three years
- Retention of new knowledge gained over three years by the farming families
- A separate economic evaluation which has demonstrated the viability of SFF intervention on health and well-being of participants and its overall value for money
- Statistically significant reduction of clinical indicators correlating to major diseases such as cardiovascular disease and type 2 diabetes
- Increased use of protective aids and equipment on farms and positive lifestyle changes consistent with action planning by participants to commit to family holidays and other stress reduction activities
- Generation of further research into the health, well-being and safety of farming families across Australia
- Recommendation of the program to other farming families by all participants

Benefits for Farmers

It is recommended that:

- The Australian government fund a national Sustainable Farm Families program to establish regional partnerships with rural and regional health services
- The SFF program be included in the annual health promotion plan of rural and regional community health services with ongoing financial support from the Australian government
- Future SFF programs be structured around partnership arrangements with institutions and organisations in health, government, industry, education and community
- The evidence-based approach remains a cornerstone of the SFF project as it is adopted by rural and regional health services across Australia
- The Australian government work with the Western District Health Service to fund a five year program to implement the previous recommendations in the report

Further Information

The project was completed in 2008.

Further information on the project is available from the RIRDC website or by contacting Susan Brumby at Western District Health Service.

RIRDC Project:

WDH-1A: 'Living longer on the land: Sustainable Farm Families in Broadacre Agriculture'

Subsequent Outcomes:

Three fully refereed conference papers have been published; numerous media articles have been printed and the Sustainable Farm Families website (www.sustainablefarmfamilies.org.au) commenced March 2006.

Contact:

Susan Brumby, Western District Health Service
Phone:: 03 5551 8464
Email susan.brumby@wdhs.net

Protecting Vulnerable Persons

7. Child Injury on Australian Farms

In Brief

- High rates of serious injury and deaths on Australian farms are of concern to all
- On average, 30 children aged less than 15 years old die on Australian farms each year as a result of farm injury. Drowning, farm vehicles and tractors are the major causes of death

- There are on average 575 children hospitalised each year in Australia as a result of farm related injuries. The most common causes are motorcycles, farm vehicles, horses and falls
- Toddlers visiting farms are most at risk
- The research completed by Associate Professor Lyn Fragar and Kirrily Pollock was used to inform a national Child Safety on Farms Strategy

Why the Research was Completed

The report was produced to provide guidance to those agencies and individuals who are working to reduce risk to children on Australian farms. The resultant publication is available electronically for use by educators and speakers to assist their efforts to raise awareness and promote child safety on farms, and for those whose role is the development of public and industry policy to improve safety. Research results were used to inform a national Child Safety on Farms Strategy.

Results Achieved

The key findings are as follows:

- On average, 30 children aged less than 15 die on Australian farms each year as a result of farm injury. One-third of these fatalities involve children who are visiting a farm at the time of injury. This equates to roughly one farm-related child fatality every ten days
- The figures show that child fatalities in rural areas are higher than urban areas and that it is the under four years of age group who are most at risk
- The table shows drowning, farm vehicles and tractors are the major causes of death
- An average of 20-25% of all hospital admissions resulting from a farm injury occur to children under 15 years. The most common causes are motorcycles, farm vehicles, horses and falls

Benefits for Farmers

The document will be used to provide guidance to agencies and individuals working to reduce risk to children on Australian farms. The research will inform the development and implementation of the National Child Safety on Farms Strategy. The strategy is a partnership between agricultural industries, farm parents, educational agencies, farm suppliers and government agencies.

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website (https://rirdc.infoservices.com.au/collections/fhs) or by contacting Associate Professor Lyn Fragar at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-121A: 'National Farm Injury Data Project - Continuation'

Key Publication:

Injury on Australian Farms – the Facts 2005

Contact:

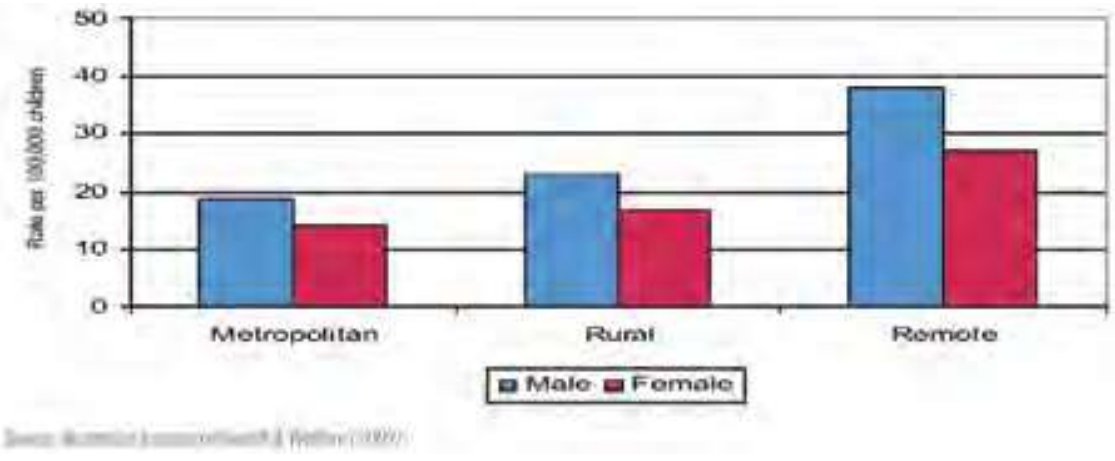
Associate Professor Lyn Fragar
Phone: 02 6752 8215
Email: nfidc@health.usyd.edu.au

Agent of injury associated with child fatalities on Australian farms by age group, 1989-1992

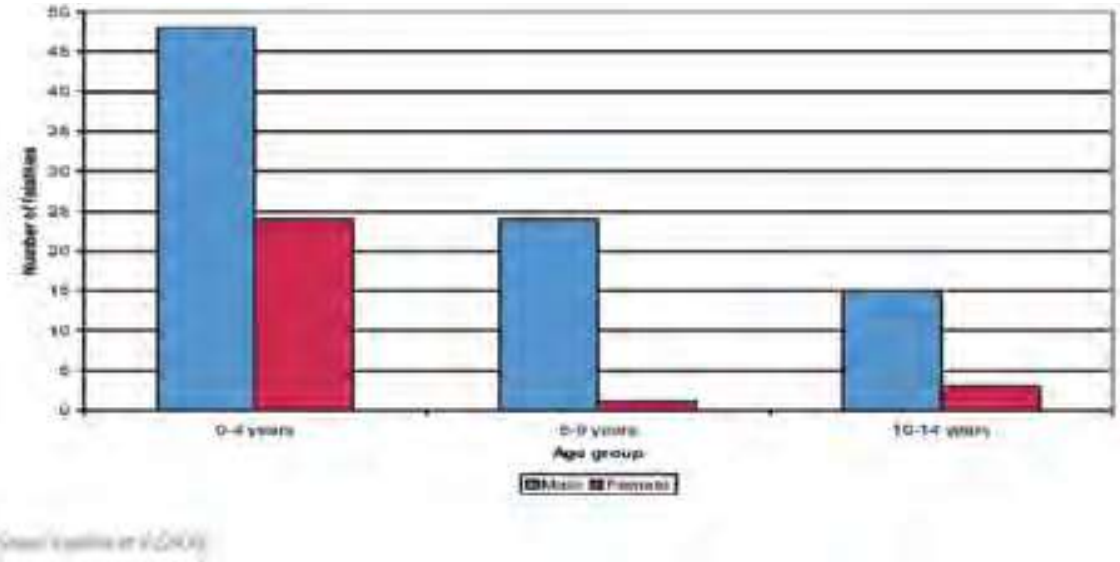
Broad agent of injury	Age group (years)		
	0-4	5-9	10-14
Vehicle	12	7	12
Tractor	7	2	2
Other machinery	4	1	1
Water body	43	5	1
Horse	1	3	1
Other animal	1	0	0
Other	6	7	1
Total	**74**	**25**	**18**

Source: Franklin et al (2005)

Average death rates for children aged 0-14 in metropolitan, rural and remote areas, Australia 1998-2000



Number of child deaths on Australian farms, by sex and age group 1989-1992



An average of 20-25% of all hospital admissions resulting from a farm injury occur to children under 15 years. The most common causes are motorcycles, farm vehicles, horses and falls

8. Safe Play Areas for Children on Farm

In Brief

- More than half of the 30 deaths of children per year that occur on Australian farms occur to children under four years of age and drowning accounts for around one third of all deaths
- Securely fenced safe play areas on farms are a key intervention for the prevention of child death and injury
- This research has resulted in the publication of a high quality resource package that provides practical advice on adapting an existing fence or building a new fence and generally improving play areas

Why the Research was Completed

Farms are unlike any other workplace as children are not generally minded in other settings with significant dangers, eg mines or factories. The research acknowledges that adults cannot always take sufficient supervision of children when they are busy and/or tired. Combine this with the fact that many farm activities involve unpredictable elements (eg cattle, horses) and the knowledge that a child's behaviour is also never entirely predictable (eg curiosity, impulsive, etc). The consequences of any one or a combination of these factors results in death or injury of many children on farms each year.

This research was therefore undertaken to help farmers who have responsibility for children, either living with them or visiting, as well as assisting those who provide OH&S and childcare advice to farming families. The research aimed to help farmers:

- Decide whether they need a safe play area
- Design and construct an effective safe play area
- Offer ideas on creativity and functionality of a safe play area

This research does **not** aim to cover *all* possible hazards that can cause death and injury to children on farms.

Children safe within an enclosed play area

Results Achieved

The research outlines the many benefits of constructing a safe play area for children, as well as acknowledging and addressing some concerns that farmers may have. It stresses that while a safe play area could go a long way to keeping kids safe, they are not always fail-safe and supervision of very young children is still crucial and must to go hand in hand with a safe play area.

The research considers the many factors involved with making a safe play area, including gates, latches or closing mechanisms, several commonly used fencing types, size considerations and permanent play structures, as well as suggesting many ideas to stimulate and excite young minds through ideas for play. The basic idea here being that a safe play area should give children many more reasons to stay in the area and play happily, rather than seeking to escape from it.

Benefits for Farmers

This research is an easy to follow guide to helping farmers adjust their property to include a bounded area that will not only keep their children safe from the hazards which may be present on a farm, but goes much further by offering insights into children's play ideas. The attachments of the report are comprehensive and clearly compiled.

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website or by contacting Laurie Stiller or Wayne Baker at the University of Sydney.

RIRDC Project:

US-126A 'Safer Fences for Children on Farms'

Outcomes:

'Safe Play Areas on Farms – A resource package (Version 2)', a guide for farms and properties where children live or visit. The resource package provides guidance on design and construction of safe play areas. It includes an assessment of fencing options, a checklist to assess fencing and an action planning sheet.

Contact:

Mr Laurie Stiller, University of Sydney
Phone: 02 6752 8218
Email: lauries@health.usd.edu.au

9. Older Farmers Health and Safety

In Brief

- This report presents facts and figures on the health and safety of older farmers in Australia
- Older farmers are at increased risk of non-intentional injury and death and more than twenty percent of injury deaths have been associated with deliberate self-harm
- Older farmer accidental fatalities were most often associated with tractors, all terrain vehicles and farm vehicles. Accidental non-fatal injury most frequently resulted from falls, animals and motorcycles

Why the Research was Completed

The report was produced to provide guidance to those agencies and individuals who are working to reduce risk associated with older farmers on Australian farms. It is also targeted at educators and developers of public and industry policy to improve farm safety.

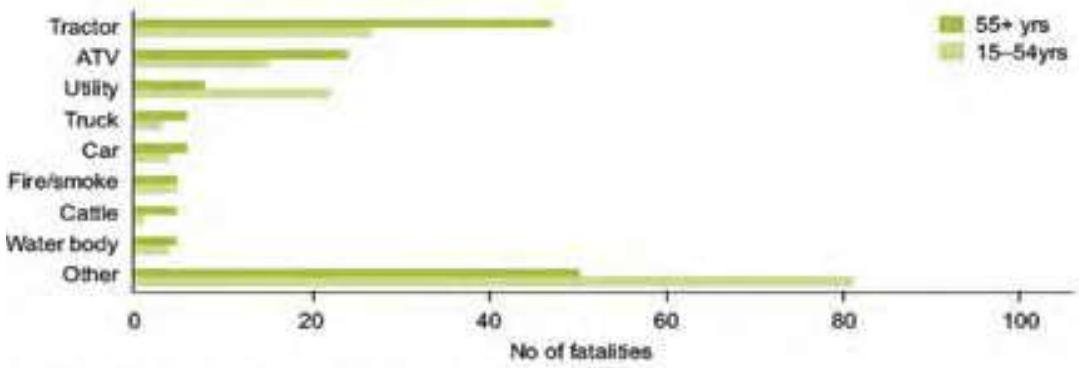
The safety of older farmers is one of the priority programs under the Farm Injury Prevention Project, which is funded by the Australian Government Department of Health and Aging. Farmsafe Australia, the national association of agencies with commitment to reducing injury risk on Australian farms, has identified the safety of older farmers as an issue requiring attention and has supported development and implementation of a national Safety of Older Farmers Strategy 2005-2007.

Results Achieved

The key findings are as follows:

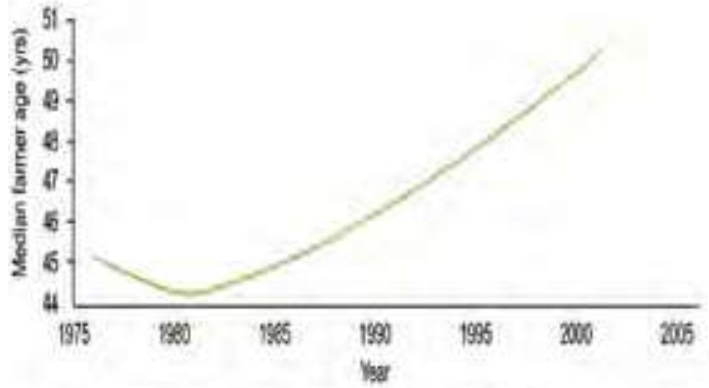
- 38% of farmers/farm managers were aged over 55 and 15 percent were aged over 65 years
- There has been a marked increase in the proportion of on-farm fatalities to older farmers over the past 15 years
- The main agents associated with death in the over 55 year age group were tractors, all terrain vehicles and farm vehicles

Agent of on-farm fatality by age group in Australia 2001-04



Source: NFIDC Farm Fatalities Study (Pollock et al, in press).

Median age of Australian Farmers



Source: Barr (2004) The Micro-Dynamics of Change in Australian Agriculture 1976–2001

- The main causal agents of non-fatal injury to older farmers were falls, farm animals and motorcycles
- A greater proportion of women aged over 55 were admitted to hospital with a fall injury
- 21 percent of fatalities caused by traumatic injury deaths in farmers and workers aged over 55 were caused by intentional self harm
- Two-thirds of farmers tested have a significant degree of hearing loss and nearly half have experienced noise injury

Benefits for Farmers

The document is being used to provide guidance to agencies and individuals working to reduce risk to older farmers on Australian farms. The document is increasingly relevant as the mean age of Australian farmers continues to increase (see figure).

Further Information

The project was completed in 2007.

Further information on the project is available from the RIRDC website (https://rirdc.infoservices.com.au/collections/fhs) or by contacting Emily Herde or Associate Professor Lyn Fragar at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:US-141A:

US-141A: 'Health and Safety of Older Farmers in Australia - The Facts - 2007'

Contact:

Emily Herde
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

The main causal agents of non-fatal injury to older farmers were falls, farm animals and motorcycles

10. Mental Health of Australian Farmers

In Brief

This booklet summarises currently available data relating to the mental health and wellbeing of farmers and covers:

- The changing structure of family farms
- The ageing profile of farmers and farm managers
- Common pressures reported by farmers that are difficult to cope with
- Available data relating to prevalence of mental health disorders
- Suicide data relating to the farming population in Australia

Why the Research was Completed

The target audience for the booklet includes policy makers, program planners and those who deliver programs that aim to influence the mental health and wellbeing of the farming population in Australia. This includes those in agricultural industries, health industries and rural communities.

Farming has long been associated with a unique set of characteristics that can promote great satisfaction with quality of life. However, apart from the well recognised risk of physical injury and accidental death, people living and working on farms are also subject to a number of environmental, climatic, economic and social stressors which may impact on their sense of wellbeing and also on their mental health.

The booklet is a product of the National Farm Injury Data Centre which aims to improve the data and evidence base for agencies and individuals operating to reduce the risk associated with working and living on farms in Australia, and those who work to improve access to effective mental health services for the rural sector.

Results Achieved

In the booklet, farmers have reported on the pressures to their businesses, their families and themselves that they find most difficult to cope with. Business pressures include finance, drought / weather, meeting government requirements, family pressures, lack of time and recruitment of labour. Family pressures are similar, but relate to family life. Lack of time and lack of relevant skills such as marketing and computing and IT skills pose difficulties for individuals.

The data indicates that while self-reported levels of distress in farming and rural communities are high, there is a need to work with farming families to reduce the high levels of suicide in this sector of the population.

Benefits for Farmers

The information presented in the booklet provides a basis for those considering how best to improve and maintain the mental health and wellbeing of the people in agriculture in Australia.

The information contained within the booklet will also be useful for:

- Defining key hazards associated with agricultural production in Australia
- Defining program needs for agricultural industries throughout Australia
- Developing effective health and safety programs that address key risks

The data is available for development of strategic approaches to improving and maintaining the mental health and wellbeing of Australian farming people. Successful implementation of appropriate strategic approaches will lessen the incidence of:

- Depression and anxiety states which, besides causing significant distress for affected farming individuals and family members, are associated with significant loss of productivity
- Prolonged psychological stress (eg loss of concentration, exhaustion, effects of medication or alcohol, indecision, lack of energy) which can affect the ability of farming people to work and manage their day to day activities
- Risk of injury to people working in hazardous, isolated farming environments without supervision and support

Further Information

The project was completed in 2008.

Further information on the project is available from the RIRDC website or by contacting Associate Professor Lyn Fragar at the University of Sydney.

RIRDC Project:

US-141A: 'The Mental Health of People on Australian Farms - The Facts'

Outcomes:

The booklet is available electronically for use by educators and speakers to raise awareness and promote farm safety, and for those whose role is the development of public and industry policy to improve safety in agriculture.

Contact:

Associate Professor Lyn Fragar, University of Sydney, Australian Centre for Agricultural Health and Safety
Phone: 02 6752 8210
Email: lfragar@doh.health.nsw.gov.au

Addressing Specific Farm Hazards

11. In-Depth Investigations of Farm Machinery Injury

In Brief

- This report focuses on farm machinery injury and identifies individual and machine characteristics that are associated with an increased risk of a serious farm work related injury
- A comprehensive analysis of a series of farm machinery events is reported, and through the application of a human factors and systems approach, recommendations are made in relation to improving machinery design to reduce the potential for injury events to occur, and to reduce the severity of resulting injury when such events do occur

Why the Research was Completed

Farm machinery injury has been identified as a priority in Farmsafe Australia's national goals, targets and strategies, as this type of injury accounts for just over 20% of injury related deaths in agriculture.

Several years ago, a unique study of all types of unintentional farm injury among men was conducted to specifically examine the risk factors for serious farm machinery injury. The study recruited seriously injured farmers and farm workers from south-east Australia and collected information about themselves, their working life and the property on which they work. This information was then compared with randomly selected farmers and farm workers who were not seriously injured to determine which personal, work and environmental factors were over-represented among those who were injured. This Stage 1 study did not investigate and assess the machinery involved as a risk factor in relation to the injury.

Therefore, an additional in-depth study (Stage 2) was completed involving an on-site inspection of the machinery to assess its characteristics in relation to the injury sustained. This Stage 2 approach had the benefit to farmers of significantly enhancing the evidence base from which preventive strategies could be developed. This was completed at a time when the National Farm Machinery Safety Strategy had identified that research was needed in the areas of:

- Defining the injury problem and its causal factors
- Improving machinery design

Results Achieved

A total of 85 injured farmers and 205 age-matched uninjured control farmers participated in Stage 1 of the study. Some 37 injured farmers and 71 age-matched uninjured control farmers took part in Stage 2. Modelling was conducted to simultaneously examine the relationship between a selected number of personal and machine characteristics, and injury outcomes, and results indicated that the following factors were statistically significant (ie higher probability) and were independently associated with machinery related injury:

- Being an employee or contractor
- Being engaged in seasonal farm work
- Using a machine that had not been purchased new

The modelling also indicated that, the odds of injury increased by 4% for each year's increase in the age of the machine.

Based on the in-depth investigation of the injury events, and the associated machinery, in Stage 2, a comprehensive range of recommendations regarding machinery design were made.

Machinery without protective guards is a major cause of injury on Australian farms

Benefits for Farmers

The study found significant potential to address a number of specific risks that exist with agricultural machinery by advocating design interventions and safe workplace initiatives. The study also identified systematic design and machinery management issues with the intention of encouraging innovative and industry-relevant safety solutions to be developed from a number of suggested practical solutions. These designs and initiatives, when adopted, will not only improve the safe working life of agricultural machinery and the state of knowledge in the industry, but more importantly will reduce the risk and incidence of machinery injury to agricultural workers.

Some of the main recommendations from the study are:

- Mobile grain auger hazards can be controlled by installing commercially available retrofit components
- Rollover and run-over hazards on tractors can be better controlled by maintaining the operator in the protected zone with the use of seat belts in addition to a roll-over protection system installation for older tractors
- State workplace health and safety authorities mandate the installation of a falling object protection system on tractors fitted with a front end loader and advise the various risks of jump starting vehicles
- That agricultural machinery industry bodies consider:
  - The provision of practical and cost effective means to access higher sections of agricultural machinery that require occasional access
  - Cost effective and practical design solutions to address the risks with lifting tillage equipment (to carry out periodic maintenance such as replacement of consumables) by providing a secondary load path to allow for the failure of the mechanism

Further Information

The project was completed in 2008.

Further information on the project is available from the RIRDC website or by contacting Dr Lesley Day at Monash University, Accident Research Centre.

RIRDC Project:

UMO-32A 'In-depth investigations of farm machinery injury'

Resultant Publications and Communication:

- *In depth investigation of agricultural machinery injuries: an extensive study of machine design and human factors.* Fifth National Farm Health and Safety Conference, Sydney, Australia, 2004
- *In Depth Investigation of Agricultural Machinery Injuries: An Extensive Study of Machine Design and Human Factors.* ESH-03 committee at the American Society Agricultural Biological Engineers annual meeting in Portland, Oregon, USA, 2006.
- In Depth Investigation of Agricultural Machinery Injuries: *An Extensive Study of Machine Design and Human Factors.* Annual International Meeting of the American Society of Agricultural and Biological Engineers, Portland, Oregon, USA, 2006.
- *Agricultural machinery design and operational safety.* Annual International Meeting of the American Society of Agricultural and Biological Engineers, USA, 2007.
- *Agricultural machinery design and operational safety (AMDOSS): risk factors for injury.* Sixth National Farm Health and Safety Conference, Adelaide, 2007
- *Agricultural machinery design and operational safety (AMDOSS): safe system design implications.* Sixth National Farm Health and Safety Conference, Adelaide, 2007

Contact:

Dr Lesley Day at Monash University, Accident Research Centre
Phone: 03 9905 1811
Email: Lesley.day@muarc.monash.edu.au

12. Machine Injury on Australian Farms – The Facts

In Brief

- High rates of serious injury and deaths on Australian farms are of concern to all
- Some 22.3% of traumatic deaths on Australian farms were associated with plant and equipment, including workshop equipment
- The research completed was used to inform the National Farm Machinery Safety Strategy

Why the Research was Completed

The report was produced to provide guidance to those agencies and individuals who are working to reduce risk associated with operation of farm machinery on Australian farms. The resultant publication is available electronically for use by educators and speakers to assist their efforts to raise awareness and promote machinery safety on farms, and for those whose role is the development of public and industry policy to improve safety. Research results were used to inform the National Farm Machinery Safety Strategy.

Results Achieved

The key findings are as follows:

- Plant and equipment was the most likely cause of accidental traumatic death on farms in the period 1989 to 1992 (see table below)
- Plant and equipment related deaths were similarly problematic throughout the 1990s and early part of the current century
- A series of recommendations were produced as a result of this research

Benefits for Farmers

Strategic approaches to reducing farm machinery injury risk are multifaceted and include:

- Identifying, elimination and substitution options
- Improving design and engineering solutions
- Administrative or work practice solutions, including education and skills development
- Identification of requirements for personal protective clothing and equipment
- Identification of incentives for adoption of improved systems
- Ensuring compliance with regulatory requirements for supply of safe plant and equipment and safe operation in the farm workplace

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website (https://rirdc.infoservices.com.au/collections/fhs) or by contacting Associate Professor Lyn Fragar at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-121A: 'National Farm Injury Data Project - Continuation'

Key Publication:

Machine Injury on Australian Farms – the Facts 2005

Contact:

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Agent of non-intentional injury death on Australian farms, 1989-1992

Agent	Work Deaths	Related Bystander Deaths	Other On-Farm Deaths	Total
Vehicle	70	43	13	126
Aircraft	46	0	0	46
Plant and equipment	**113**	**24**	**2**	**139**
Materials	12	0	1	13
Dam/river/creek	15	46	9	70
Power lines	11	0	1	12
Other Farm Structure	20	14	5	39
Horse and animal welfare	26	4	10	40
Hazardous substances	3	1	2	6
Trees being felled	17	3	2	22
Fire/smoke	4	0	13	17
Other working environment	10	1	4	15
Firearms	18	5	4	27
Other	8	1	6	15
Total	**373**	**142**	**72**	**587**

13. Injury Involving Tractor Run-Over

In Brief

The aim of this project was to collate and analyse available injury data and case reports relating to events involving victims being run over by a tractor in order to:

- Define the injury problem and identify contributing factors
- Recommend a range of measures to improve the safety associated with the operation of tractors and to reduce the number and severity of injuries resulting from events leading to the victim being run-over. Such measures, when successfully implemented, will bring about a reduction in the human and financial costs associated with farm tractor incidents

Why the Research was Completed

For several decades, death and serious injury caused by tractor run-over on Australian farms has been identified as a major issue for agriculture and horticulture.

While manufacturers have been slowly incorporating improved designs that reduce this risk such as neutral start switches and safe operator access, there has been no direct program aimed at reducing such risk. This research and the report produced from it establishes the key risk factors and develops a number of recommendations to reduce risk by way of a multifaceted direct program approach.

Results Achieved

An extensive library / internet search revealed that information contained in reports prepared some time ago was often found to be directly relevant to the current project. This indicates that little progress has been made in putting safety recommendations into practice despite the problem having been widely recognised for some time. This may be due in part to the continuing use of old tractors.

Data was obtained from all Australian states covering a total of 215 cases (107 operators, 46 bystanders, 43 passengers and 19 people playing) where the victim was run-over by the tractor, pinned by the tractor, or run over by an implement from incidents such as falling from a tractor, mounting / dismounting a moving tractor and starting a tractor from the ground. 110 of the incidents were fatal and 105 were non-fatal, indicating a high fatality rate from such incidents. Many of the non-fatal incidents resulted in traumatic injuries to the victim.

Some 28 recommendations were developed to provide guidance to tractor designers, manufacturers, suppliers and end users, farm families, regulatory bodies and agricultural advisors, on planning and implementing programs designed to reduce the risk factors associated with tractor operation and to bring about a reduction in the frequency and severity of traumatic injury caused by tractor run-over.

Benefits for Farmers

Some of the main recommendations developed from this project are:

Design / manufacture of new tractors

- Access to the seat for operation is only allowed from outside the wheel track whilst access to the electric starter motor is prevented whilst standing between the wheels
- An interlock control system should be required to be fitted preventing egress until the controls are locked in a safe position
- An audible reverse warning device should be fitted along with an emergency stop control button located in a position accessible from outside the wheel track area of the tractor
- Cabin door latch handles should be operated by lifting upwards, or otherwise designed to minimise inadvertent opening

Existing tractors

- A cost rebate scheme should be instituted for farmers fitting safe access systems to older model tractors
- All older tractors should be retrofitted with rollover protection structures (ROPs) and seat belts
- Farmers should be advised to fit a guard to older model tractors to prevent 'jump starting'
- Tractors operating in restricted areas should be fitted with an audible reverse warning device

Other

- A media campaign should be carried out to publicise the benefits of fitting a safe access system to tractors and to focus farm workers on tractor run-over hazards, demonstrating the economic cost of tractor injury events, and the advantages of safety features. This campaign should emphasise the high risk of tractor run-over injury to young children
- A research program should be carried out with the aim of developing a practical operator sensing system for use on agricultural tractors
- The use of front and saddle mounted chemical tanks should be investigated with a view to determining the hazards presented by such equipment, and to recommend design requirements or alternative designs

Access is from in front of the rear wheels. A safe access platform is necessary to reduce the run-over hazard.

The same tractor fitted with a safe access system.

Further Information

The project was completed in 2006. Further information on the project is available from the RIRDC website or by contacting Associate Professor Lyn Fragar at the University of Sydney.

RIRDC Project:

US-87A: 'Farm Machinery Safety: Injury Involving Tractor Run-Over'

Contact:

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14. Tractor Power Take-Off (PTO) Shaft Guards

In Brief

Since its introduction in the late 1920s as a key mechanism for transfer of power from tractor to machine, the power take-off (PTO) shaft has been involved in large numbers of serious and disabling entanglement accidents, many resulting in death. Over the last 70 years or so a variety of guards, shields and couplings have been designed to try to eliminate or minimise the risk of entanglement.

Why the Research was Completed

This report briefly examines the problems associated with PTO shafts guards and considers options for improvement to:

- Describe the materials currently used in PTO shaft guards
- Define problems associated with current materials used in manufacture of PTO shaft guards
- Identify options for improved materials
- Make recommendations for improved materials

The report is targeted at policy makers, farmers, machinery manufacturers and resellers.

Results Achieved

The research shows that the design of most guards is probably satisfactory for providing a reasonable reduction in the risk of injury during the short period when they are new and undamaged. However, it seems difficult to find a perfect solution for guards that operate in a very aggressive environment.

Physically, guards crash, rub and push against each other and other parts such as tractor draw bars, frame members and tractor linkage arms. In addition, guards rust, age, become brittle and simply perish due to exposure to UV radiation, heat and cold, dust and salt. On farms, PTO guards can quickly become damaged and then make connection difficult and or increase the risk of injury.

As a result, many guards are removed and not replaced. The farmers interviewed were not aware that PTO guards can be replaced cheaply and easily.

The results of the research have been considered by the Farmsafe Australia Farm Machinery Safety Reference Group and action based on the report findings and the responses from Australian suppliers and operators have been implemented.

Benefits for Farmers

Strategies for minimising damage to guards include working with farmers to:

- Improve operator awareness and skill in working with PTOs
- Encouraging farmers to maintain accepted levels of safety and to replace damaged guards

Manufacturers should be encouraged to improve guard design and guard materials.

The report recommends that Standards Australia be requested to undertake a review of Standard AS 1121-1983 in light of:

- Development of newer guarding systems
- Developments in the plastics industry
- Need for testing of guarding systems to account for UV radiation, heat and cold, dust and salt

Further Information

The project was completed in 2006.

Further information on the project is available from the RIRDC website or by contacting Associate Professor Lyn Fragar at the University of Sydney.

RIRDC Project:

US-87A: 'Farm Machinery Safety: Power Take-Off Shaft Guards'

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Clip-held removable Master Guard covering the connection of PTO shaft to tractor PTO

The red circular metal guard covers the universal coupling joining the PTO shaft to the implement. The restraining chain and tie are used to stop the PTO shaft from falling onto the implement

15. Injuries Associated with Posthole Diggers

In Brief

Posthole diggers are a common implement found on most Australian farms and are used for fencing and fence maintenance. However most posthole diggers are only operated on an infrequent basis, thus the operator is often not familiar with the associated hazards.

All available injury data and case reports relating to accidents involving the operation of a posthole digger was collated and analysed. This information was used to:

- Define the injury problem and identify contributing factors
- Recommend a range of measures to improve safety levels and to reduce the number and severity of injuries resulting from accidents while operating posthole diggers
- Through the above measures bring about a reduction in the human and financial cost of posthole digger accidents

Why the Research was Completed

The intermittent and infrequent use factor raises the possibility that on a 'per hours of use' basis, posthole diggers are among the more dangerous machines to be found on a farm. A national survey of 1,200 farmers carried out in 1993 by the Kondinin Group showed 86% reported having a posthole digger, and 29% a post driver.

The extent of the problem of injury related to operation of posthole diggers was not clear at the time the National Farm Machinery Safety Strategy was formulated in June 1998 by Farmsafe Australia. However there were indications of the possibility of three deaths per year on average, with a proportional number of injuries. This report establishes that most of these items of equipment have significant safety risks and a multifaceted approach to reducing risk of death and serious injury has been recommended.

Results Achieved

The one fact that became obvious from the case studies of events involving posthole diggers was that, while such events are not numerically common, the resulting injuries are extremely traumatic. This necessitates remedial action be taken to reduce the risk factors and thereby reduce the injury events.

The risk factors identified from the available literature were reported in relation to operator risk factors, machine risk factors and environmental risk factors. Consideration of these and of the nature of the injury and the body part affected, allowed for options for risk reduction to be documented.

Benefits for Farmers

The following recommendations are made to the Farmsafe Australia Machinery Safety Reference Group for the reduction of risk associated with operation of posthole diggers in Australian agriculture and horticulture industries:

- Information material be prepared and made readily available to rural workers outlining the hazards associated with the operation of posthole diggers and the correct operating procedures to be followed to reduce those hazards. This material should include information relating to modifications that may be carried out on existing machines. Manufacturers should be consulted and asked to participate in the development of such material. The document should be developed as a nationally endorsed Guidance Note
- Educational material be prepared and made available to rural education and training institutions
- Posthole digger manufacturers be encouraged to ensure their machines achieve the highest possible safety standards, and that safe operation be actively promoted by sales personnel and via improved, comprehensive operators' manuals. Operators should be made aware of the risks that the manufacturer has not been able to eliminate and to ensure they do not use the machine in a way that will create new risks

The worker standing behind the digger is in danger of being struck and/or entangled if the auger hits an object and jumps from the hole. Wire, steel posts and tools lying near the posthole increase the hazard

- Suppliers ensure that safety information is provided to buyers of posthole diggers. The design and fitting of safety features is of little use unless sales personnel are required to discuss safety issues with customers and emphasise the importance of features such as force-down rams
- Farmers be encouraged to dispose of older posthole diggers and to use fencing contractors for fencing requirements
- An Australian Standard be prepared for the design and operation of posthole diggers, encouraging the broad use of available safety features and establishing a level of safety that is economically achievable. The Australian Standard AS1121-1983, *Guards for Agricultural Tractor PTO Drives,* requires revision to ensure that optimal safety requirements are met within practical limits
- A method of recording rural accidents be introduced that will provide the data necessary for future accident research
- Future event data relating to posthole digger accidents be analysed in an ongoing manner to enable knowledge of the causal factors to be improved

Further Information

The project was completed in 2006. Further information on the project is available from the RIRDC website or by contacting J Miller, Associate Professor Lyn Fragar or R. Franklin at the University of Sydney.

RIRDC Project:

US-87A: 'Farm Machinery Safety: Injury Associated with Posthole Diggers'

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16. Tractor Access Platform Evaluation

In Brief

- At the time of this research in 2001-2002, tractors account for approximately 15% of work-related fatalities among those employed in agriculture in Australia, which was an average of 22 deaths per year
- Mounting and dismounting a tractor has been identified as a common precursor to tractor run-over events, a leading cause of tractor related fatalities
- Two farm safety action groups in Victoria had fitted a number of tractors with safe access platforms and this report outlines the results of an evaluation of the uptake and implementation of this initiative

Why the Research was Completed

The research was completed to explore the benefits and costs of retro-fitted safe tractor access platforms and to compare the design features of the retro-fitted platforms with access on new tractors.

Tractor run-over events are a leading cause of adult work-related injury on farms. Farm safety action groups in Victoria have retro-fitted tractors with safe access platforms designed to reduce run-over deaths and serious injury. The groups used guidance material produced by a reputable agency – the Australian Centre for Agricultural Health and Safety. Lesley Day and George Rechnitzer of Monash University undertook an evaluation of this initiative, focussing on the operational and design aspects of the retro-fit. They interviewed ten farmers who had retro-fitted their tractors with safe access platforms and inspected the tractors. In addition, access features of seven new tractors were examined.

Results Achieved

The initial implementation of safe access platforms was relatively successful. The safety of access was unquestionably improved. The platforms generally met design specifications although adherence to two key features relating to the positioning of the outer edge of the bottom step, and guarding of the rear wheel was poor on some of the tractors that had been retrofitted.

The estimated reduction in potential damage to farmers from a fall ranged from 30-40% to 90-95%. There was little evidence to suggest increased passenger carriage may occur as a result of the retro-fitted platforms, ie an increase in passengers hitching a lift on the running board.

The platforms had little impact on tractor operations, but had a significant impact on ease of access. The average cost to the farmer of retrofitting a tractor was between $310 and $446.

The retro-fitted tractors performed at about the same level or better than the new tractors on most access features.

New tractors inspected had step height, rise and tread depth dimensions that were unsatisfactory, compared to the recommended access specifications in the guidance material. Some had issues in positioning of the bottom step in relation to the outside edge of the rear wheel. Some had issues in relation to non-slip material on treads that did not extend to the outer edge of the step. None of the new tractors had a handrail which fully defined the front of the access path. There was little or no guarding of the rear tyre.

Benefits for Farmers

This initiative has the potential to significantly reduce tractor run-over deaths and injury, in addition to improving the physical work demand associated with getting on and off tractors. This improvement in access has implications for an aging farm workforce with diminished mobility.

Platform retro-fitment could be considered to be current best practice in the management of tractor run-over risk. Further implementation should include mechanisms to increase adherence to key design features.

The researchers make recommendations regarding promotion, review of currently available non-slip materials, involvement of skilled engineers, critical characteristics of platforms, precautions for passenger carriage, the need to address other aspects of run-over prevention, and safe access on new tractors.

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website or by contacting Dr Lesley Day at Monash University.

RIRDC Project:

UMO-29A 'Preliminary Safety Tractor Access Platform Evaluation'

Resultant Publications and Communication:

- Paper delivered to the Sixth National Conference on Injury Prevention and Control, Perth, Australia, 2003
- Paper titled *'Farm Guidance Material to Change on the Ground Practice: Evaluation of Safe Tractor Access Platforms'*

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17. All Terrain Vehicle Safety Strategy

In Brief

- All-terrain vehicles (ATVs) have emerged over the past decade as a useful vehicle on Australian farms
- However, their use is associated with a growing number of fatalities on farms and Farmsafe Australia has recognised this as a key OH&S issue for the farm sector
- This synopsis reports the outcome of research to develop a nationally agreed approach to reducing risk of death and serious injury due to ATV operation on farms and that such an approach is built on a strong evidence base to ensure ATV safety programs are effective

Why the Research was Completed

The purpose of this research was to establish a framework for development and oversight of a national strategy aimed at reducing risk of death and serious injury associated with operation of ATVs on Australian farms.

Around ten deaths occur each year associated with ATV operation. In 2003, Farmsafe Australia established the ATV Safety Reference Group to examine available information relating to risk factors associated with serious injury and death associated with ATV operation.

Results Achieved

The ATV Safety Reference Group found that:

- Information and support is needed by farmers to manage ATV risk and meet OH&S regulatory obligations
- ATVs have a tendency to roll over and crush the operator or fling the operator from the machine
- More specific information is needed to specify the safety limits of slope, terrain and loading of ATVs, including liquid loads and the suitability of attachments
- Manufacturers of ATVs do not currently support the fitment of rollover protective structures (ROPS) and there is conflicting evidence of the effectiveness of ROPS and rider restraints
- There is now a range of small farm vehicles that may be a safer alternative to ATVs
- Guidelines need to be developed for farmers, employers and farm managers to provide information relating to risk management solutions and safe operation of ATVs
- The operation of ATVs with passengers reduces stability and adds to risk of roll over
- Children are at increased risk of serious injury and death and should be discouraged from riding ATVs
- Training in safe ATV use for specific farm situations is needed and should be widely promoted (see 'Reducing All-Terrain Vehicle Injuries with Training' chapter below)

Benefits for Farmers

On the basis of these findings, a multifaceted national strategy – *Safe Operation of All-terrain Vehicles and Utilities on Australian Farms – An Industry Strategy 2004-2009*, was finalised and has been adopted by Farmsafe Australia. The strategy will provide guidance to the range of stakeholders who will be actively engaged in working with farmers to reduce risk of serious injury and death associated with ATV operation on farms.

The National Strategy is found at the Farmsafe Australia website: www.farmsafe.org.au.

As a result of the groundwork undertaken by this project, the Department of Health and Aging has funded a project that will ensure that the Strategy is implemented across Australia.

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website or by contacting Associate Professor Lyn Fragar at the University of Sydney.

RIRDC Project:

US-122A 'A National Strategy for Improving ATV safety on Australian Farms'

Publications:

'ATV Injury on Australian farms - The Facts – 2007' by Christine Morton, Associate Professor Lyn Fragar and Kirrily Pollock.

Outcomes:

The National Strategy is found on the Farmsafe Australia website: www.farmsafe.org.au

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Larger small vehicle fitted with a rollover protection structure (ROPS)

18. Reducing All-Terrain Vehicle Injuries with Training

In Brief

- This publication reports the results of research conducted by the Combined Universities Centre for Rural Health in Geraldton that assessed the effectiveness of rider training involving six Agricultural Colleges in rural Western Australia

Why the Research was Completed

Although there is very limited published research in this area, overseas data along with an Australian study, indicate that the use of both two wheel and four wheel agricultural motorbikes account for between 8-11% of all injuries which occur on farms. Accidents among young riders (15-19 years of age) are particularly high. In spite of this, more than 97% of agricultural motorbike riders in Australia have had no formal training and most believe training would be useful. This study looked at assessing the impact of an All Terrain Vehicle (ATV) rider training program on the number of farm injuries, especially among adolescents.

Results Achieved

Due to the difficulty in obtaining the follow up data, conclusive results are not available. However, available findings did show a very slight decrease in injury in the 'trained' group verses the 'control' group. Furthermore, information that was gathered from the initial survey indicated that the number of injuries sustained and the seriousness of injuries may in part be related to:

- The type of bike involved as there had been a greater number of injuries sustained on two wheel bikes rather than four wheel ATVs, however injuries from the four wheel ATVs could be more serious
- How training is given, whether self-taught or via and adult or friend/sibling – it appears that being taught by an adult has a greater protective effect
- Risk taking behaviour, particularly the factors of speed and helmet use, as those who *were* injured were less likely to wear helmets and they reported that they would generally ride at greater speeds. This increased speed factor adds weight to other studies which suggest an increase in injury risk as engine size increases

It is hoped that the information gathered from the initial surveying alone could be enough to raise the significance of this issue within rural communities, as, although no economic value has been attempted, there is evidently significant medical and social costs associated with ATV injuries.

One of the most positive findings of the study was the relatively high use of helmets and some other protective clothing particularly for recreational use, but hopefully with a flow on effect into farming duties.

ATV quad bike with rider protected by a helmet

Further studies need to be carried out into the effectiveness of on-going rider training courses as to whether these courses reduce or increase the injury rate as there may be possible over-confidence develop in riding skills. Any possible training systems may need to address not just the riding skills but also the trainee's psyche in relation to attitude, risk and vulnerability.

Many previous studies have emphasised the need to enforce legislation regarding the use of ATVs. However, in the USA legislation enforcement appears to have had little effect and in Australia any enforcement is thought to be near impossible.

Three OH&S requirements are identified:

- The equipment is in sound and safe functional order
- The individual must have the skills and knowledge to safely carry out the task
- That adequate supervision is provided given the level of skill of the rider

While it is relatively easy to check whether equipment is in safe working order, skill and supervision levels are far harder to benchmark and competency levels listed in Vocational Education Training material may need to be reviewed and linked to attitude and motivation rather than age.

Further work needs to be completed to ascertain how effective safety improvements are on ATVs, for example incorporation of Roll Over Protection Structures on four wheel vehicles.

Policy recommendations:

- More safety promotion at point of sale, eg helmets, protective clothing, rider safety training
- Further guidelines for ATVs to farms and agricultural training institutions
- Review of rider competencies and possible axing of the 16 year old age limit
- Closer monitoring of injuries at hospital emergency departments

Educational recommendations:

- Rider competencies reassessed to include attitudinal skills
- Further assessment of effectiveness of rider training
- Educational material to stress importance of role models
- Educational material to help adults in basic training of novice riders
- Inclusion of effective rider training program in agricultural training organisations

Engineering recommendations:

- Promotion of speed limiters for agricultural motorcycles
- Re-design seats of ATVs to restrict numbers able to ride
- Continuously reassess engineering solutions to address rider injuries

Enforcement recommendations:

- OH&S regulations enforced at point of sale

Research recommendations:

- Further study into ATV/bike related injuries for all age groups, especially under 16 y.o
- Further collaboration to define competencies for riders
- Economic impact assessment on agricultural motorbike injuries
- Cost benefit study of effectiveness of rider training
- Research into protective equipment
- Better systems to track agricultural students after graduation

Benefits for Farmers

The study confirmed that all ATVs are potentially dangerous with four wheel vehicles safer than two. The study highlighted risks associated with inadequate training and farmer complacency, along with the importance of implementing farm safety policies which should include ATV usage.

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website or by contacting Dr Tony Lower at Curtin University of Technology.

RIRDC Project:

CUT 7A: 'Reducing All-Terrain Vehicle Injuries - A randomised control study of the effect of driver training'

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19. Noise Injury Prevention in the Farming Community

In Brief

- Noise injury is a significant problem in the farming community with a considerable number of farmers having hearing problems by age 40 and hearing aids in their 50's. Those working on farms as young as 15 are also showing signs of noise injury
- Farmsafe Australia has a goal of reducing the number of young farm people with noise reduced hearing loss. New South Wales is the only state that has made progress towards this goal, having run hearing screenings at major field days and provided noise reduction strategies to 6,000 farmers since the program began
- Much of the current information being provided to farmers is over 25 years old and noise injury reduction progress is hampered by differences in health infrastructure from state to state

Why the Research was Completed

The research set out to:

- Gather information about the current noise levels on farms
- Examine the current hearing status of young farmers
- Develop resources that enable farmers to better manage their hearing health
- Expand the New South Wales hearing conservation program from New South Wales to the rest of Australia through the development of a national strategy

Results Achieved

Research was conducted on 48 farms across a range of different agricultural commodities, with noise levels recorded at the ear of the operators and any others in close proximity. Average and peak noise levels were recorded for 56 types of machinery / activity sites on farms, totalling 298 separate items / activities.

Also, an analysis of information collected from 808 farmers and farm workers who had presented at a New South Wales field day was examined. Additionally, a reference group from individuals working in agriculture, audiometry and health & safety was established to produce a strategy for the prevention of noise injury on farms.

A report establishing baseline hearing screening results and exposure information was then produced. This report clearly showed that even at young ages, people working on farms display signs of noise injury. Also, a strategy for the prevention of noise injury on farms was produced and has been adopted by Farmsafe Australia. This strategy is available in an electronic format.

Benefits for Farmers

The farming community's establishment of strategies to restrict noise exposure to all people on farms will clearly have a beneficial impact in terms of reducing the extent of noise reduced hearing loss.

This in turn will reduce the incidence of the problem in not only the 40 – 50's age group of farmers and farm workers but also reduce the extent of commencement of the problem in young people on farms aged 15 - 24 years.

Successful implementation of strategies by the farming community to restrict noise exposure to all people on farms will therefore reduce the extent of suffering and discomfort associated with noise reduced hearing loss as well as reducing the incidence of remedial expense measures such as hearing aids.

Further Information

The project was completed in 2002.

Further information on the project is available from the RIRDC website or by contacting Ms Julie Depczynski at the University of Sydney.

RIRDC Project:

US-111A: Preliminary stage of noise injury prevention in the farming community

Publications:

Depczynski J, Franklin RC, Chalinor K, Williams W, Fragar LJ (2002) *Farm Noise Hazards: noise emissions during common agricultural activities.* ACAHS & RIRDC: Moree

Franklin RC, Chalinor K, Depczynski J, Fragar LJ (2002) *Noise Exposure, Hearing Protection and Noise Injury in Young Adult Farmers.* ACAHS & RIRDC: Moree

FSA (2002). *Noise injury Prevention Strategy for the Australian Farming Community.* Farmsafe Australia

Noise Emission Fact Sheet

Contact:

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20. Animal Handling Facilities, Dust and Respiratory Illness

In Brief

- This study is concerned with the health implications of dust from animal handling facilities
- Agriculture has become more intensive in the last 50 years resulting in greater exposure of farmers to dust and small particles of a biological nature. There has also been an increase in respiratory illness in farm workers when compared to other non farming populations
- Agricultural dust can be classified in two ways – fine inhalable dust and superfine respirable dust which can pass through the lungs and into the blood stream
- This later type of dust is often biological in nature and made up of entities such as virus, bacteria, fungi, algae and protozoa. Australian studies have not yet attempted to classify the types of viruses, bacteria and fungi present in superfine agricultural dust
- Current Australian standards used for exposure to airborne contaminants in animal handling industries need to be revised. They are not currently based on agricultural dusts let alone those generated by animal production facilities

Why the Research was Completed

The research was completed to inform Australian occupational health and safety and environmental health practitioners who may need to advise farm owners/managers on the potential respiratory risks for their workers from exposure to animal handling dusts.

The report will also be useful to medical practitioners whose patients may be employed in animal handling facilities and presenting respiratory symptoms that may be a result of their work. The report will also inform policy development and will help RIRDC as it plans its research and development priorities into the future.

Results Achieved

The report reviews more than 250 Australian and international papers and reports on the topic. This literature acknowledged that farm workers may experience respiratory illness symptoms as a consequence of working in these conditions. The link between the often dusty work environment of animal husbandry workers and its adverse impact on health is not as well defined as was expected, as very few international airborne dust exposure studies have been adequately linked to health studies and none in Australia.

Benefits for Farmers

The importance of this report is that it provides basic statistical information on the impact of dust on farm workers employed in the pig, poultry, cattle, sheep, horse and deer industries (see table below).

The report has identified that more detailed studies on the impact of exposure to dust on the health of agricultural workers need to be undertaken in Australia.

Further Information

The project was completed in 2006.

Further information on the project is available from the RIRDC website or by contacting Dr Sue Reed at the University of Western Sydney.

RIRDC Project:

UWS-19A: 'Dust and bioaerosols exposures and respiratory illness in farmers – animal handling facilities: A literature Review'

Contact:

Dr Sue Reed
School of Environment and Agriculture
University of Western Sydney
Locked Bag 1797
Penrith South DC NSW 1797
Phone: 02 4570 1492
Email: s.reed@uws.edu.au

Summary of Average Worker Exposure to Dust in Animal Handling Facilities

Animal Industry	Inhalable Dust	Superfine Dust (able to pass though the lungs)	Endo-toxins	Fungi	Bacteria	Sources
Safe exposure level	10	3				Australian Standards
Pigs	10.04	0.81	841.7		2.08 x 105	Rhyder 1993, Holyoake 2002, Chinivasagam and Blackall 2005
Poultry	9.95	0.48				McGarry and Ivin 2002
Sheep shearing	0.74			3.43 x 103	2.84 x 103	Kift et al 2004b
Horse feed sheds	8.49	1.08	66.0	1.49 x 103	0.86 x 103	Reed et al 2003b and Davidson 2004
Cattle feedlots	0.20	2.72		1.80 x 103	1.42 x 103	Reed et al 2003a
Deer	2.74	1.64		0.91 x 103	2.53 x 103	Kift et al 2002a

21. Pesticides and Adverse Health Outcomes

In Brief

- There are between 10 and 20 people fatally poisoned by pesticides each year
- The organophosphate/carbamate group of pesticides were associated with the greatest number of deaths
- People employed in agriculture or horticulture comprised 21 of the 81 deaths recorded between 1997 and 2001
- People employed in the horticulture sector are most at risk from pesticides exposure

Why the Research was Completed

Data which describes the full, or even partial, extent of human health effects from exposure to pesticides is difficult to source due to potential long latency periods for chronic illness, the difficulty in diagnosis, the non-specific nature of pesticide health effects and the lack of effective monitoring systems.

This project was completed to provide the Australian Pesticides and Veterinary Medicines Authority (APVMA) with information on agricultural chemicals pertaining to public health, worker exposure and environmental safety.

The research resulted in two reports – a summary document available on the RIRDC website called 'Pesticides and Adverse Health Outcomes in Australia' (Publication No. 05/051, Project No US-121A) and a more detailed document for the APVMA titled 'Pesticides and Human Health – A Report of Health Data Related to Pesticides in Australia (2003).

Results Achieved

The research reviewed data from:

- Australian Bureau of Statistics (ABS) deaths data
- Data relating to hospital admissions held by the Australian Institute of Health and Welfare related to admissions due to acute pesticides poisoning
- Workers' compensation claims data relating to poisoning from pesticides
- Poisons information centres data registering calls related to pesticides

The information reported excludes data relating to presentations to hospital emergency departments and to medical practitioners. Nor does the data reflect any long term health effects of exposure to pesticides.

From the available data the following was apparent:

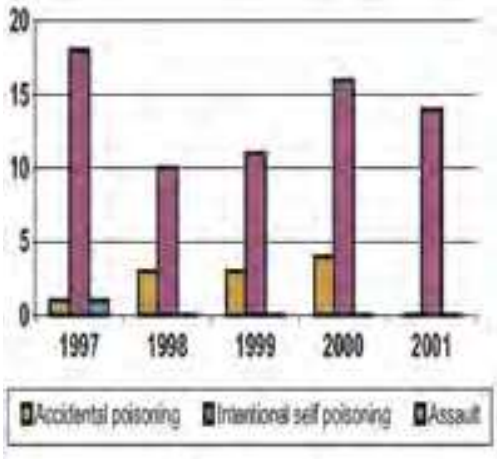
- There are between 10 and 20 people fatally poisoned by pesticides each year, most are intentional self poisonings. Adults 35 to 74 years of age are most at risk (see figure)
- The organophosphate/carbamate group of pesticides were associated with the greatest number of deaths (of which 77% were intentional), followed by herbicides and fungicides (see table)
- People employed in agriculture or horticulture comprised 21 of the 81 deaths recorded between 1997 and 2001. Farmers were the occupation most likely to die of pesticide poisoning
- Persons hospitalised as a result of pesticide poisoning were more likely to be male. Sixty percent of all admissions were classified as accidental
- There are around 1,500 calls each year to poisons information centres. Some 54% of these calls are for children
- The majority of claims submitted to workers' compensation agencies across Australia relating to exposure to plant and animal treatment chemicals relate to the agriculture/forestry/fishing industry group
- Horticultural and fruit growing industries are the agricultural sectors at greatest risk of pesticide exposure

Benefits for Farmers

The document has been produced to provide guidance to those agencies and individuals who are working to reduce risk associated with pesticide use in Australia.

The publication is available electronically for use by educators and speakers in their efforts to raise awareness and promote safe handling of pesticides and for those whose role is the development of public and industry policy to improve chemical safety.

Number of persons fatally poisoned by pesticides, by year and intent, Australia 1997-2001



Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website (https://www.rirdc.gov.au) or by contacting Associate Professor Lyn Fragar, B Sankaran or P Thomas at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-121A 'Pesticides and Adverse Health Outcomes in Australia'

Key Publication:

Pesticides and Adverse Health Outcomes in Australia 2005

Contact:

Associate Professor Lyn Fragar
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

Horticultural and fruit growing industries are the agricultural sectors at greatest risk of pesticide exposure

22. Organophosphate Exposure

In Brief

- A PhD research project was undertaken to investigate Organophosphate (OP) pesticide exposure received by fruit and vegetable growers in South East Queensland targeting both occupational health and safety issues and risk assessment and health surveillance
- The report produced from the research project presents the results of urine metabolite testing of three occupationally exposed groups and one non-occupationally exposed control group

Why the Research was Completed

The broad aim of the research project was to characterise OP pesticide exposure and to assess the feasibility of using urine metabolite testing as a risk assessment tool for agricultural and related industry workers exposed to OP pesticides.

OP pesticides, as a group, are the most widely used insecticides in Australia with approximately 5,000 tonnes of active ingredient used annually by various sectors of the Australian agricultural industry. Workers in the agricultural industry, particularly those involved with mixing, loading and application tasks, are at risk of exposure to OP pesticides.

It is therefore important that these workers are able to manage their risk of exposure as well as assess their risk of health effects from exposure to OP pesticides. However, currently in Queensland, the workplace health and safety legislation exempts the agricultural industry from hazardous substance legislation that incorporates the requirement to perform risk assessments and health surveillance (blood cholinesterase testing) for OP pesticide exposure.

Results Achieved

Participant farmers were drawn from the main cropping areas in south-east Queensland. The farmer group was characterised by small owner-operators who often had primary responsibility for OP pesticide mixing and application and who had a good general knowledge of pesticide-related safety practices.

However, despite this knowledge, use of personal protective equipment (PPE) was low. More than half of the farmers did not wear a mask or respirator (56%), gloves (54%) or overalls (65%).

Material Safety Data Sheets (MSDSs) were never or rarely read and there were also problems with chemical suppliers providing farmers with MSDSs. Some 88.2% of farmers never or rarely read OP pesticide labels before application. The majority of farmers (90.2%) reported that they had never had any health surveillance performed and three-quarters had never read about or been shown how to perform a formal risk assessment.

Fruit and vegetable farmers, whose typical pattern of OP pesticide use was infrequent, of short duration and involved application via a boom on a tractor, recorded low urine metabolite levels. Formulators exposed to OP pesticides were found to have the highest urine metabolite levels, followed by pilots and mixer/loaders and then farmers.

The observed metabolite levels were not associated with a drop in blood cholinesterase activity among the formulation plant workers, as was expected. Urine metabolite levels recorded for all groups are unlikely to be associated with acute health effects. In contrast, there is insufficient scientific knowledge to know whether levels recorded in this study and elsewhere may be associated with long-term, chronic health effects.

Benefits for Farmers

Based on the findings of this research, a guide has been developed to assist farmers in the completion of a risk assessment of their and /or their employee's exposure to organophosphate pesticides. The guide incorporates the use of a urine metabolite test as part of the risk assessment process. The guide would also be of assistance in completing risk assessments for other chemical exposures on the farm.

Should the Qld Government remove the rural exemption for OP use, farmers will need further instruction in the requirements of the legislation and in particular, how to conduct a formal risk assessment for chemical exposure including OPs. However, use of the guide will assist farmers with the preparation of a formal risk assessment.

Further Information

The project was completed in 2007.

Further information on the project is available from the RIRDC website or by contacting Kelly Johnstone at Queensland University of Technology or Professor Michael Capra at Newcastle University.

RIRDC Project:

QUT-5A: 'Organophosphate Pesticide Exposure in Agricultural Workers – human exposure and risk assessment'

Key Publication:

Users Guide for Assessing Exposure to Organophosphate Pesticides for Fruit and Vegetable Growers (RIRDC publication number 07/155).

Contact:

Kelly Johnstone
Queensland University of Technology
Professor Michael Capra
Newcastle University
Phone: 02 4348 4021
Email: k.johnstone@aussafe.com.au
Mike.Capra@newcastle.edu.au

Industry Specific OH&S Risks And Responses

23. Dairy Industry OH&S Risks

In Brief

- This report presents facts and figures on the risks involved in Australia's dairy industry
- Dairy is relatively safe when compared to all Australian agriculture – 19.9 incidents per 1,000 workers compared to a 24.2 average for all Australian agriculture but less safe than all other Australian industries at 17.4 incidents
- Most dairy accidents occur in association with cattle handling, hot water scalds, motor cycle and motor vehicle accidents, cutting objects and falls

Why the Research was Completed

The report was produced to provide guidance to those agencies and individuals who are working to reduce risk in the dairy industry. It is also targeted at educators and developers of public and industry policy to improve farm safety.

Results Achieved

The key findings are as follows:

- A minimum of 17 work related deaths have occurred on dairy farms over the past nine years
- Injuries associated with mobile plant and transport, environmental and animal agents comprise a high proportion of injuries in the dairy industry, compared to all agriculture combined
- Of all dairy industry workers' compensation claims, 38% of injuries were inflicted by cattle The document shows a steadying trend in dairy farm accidents

Benefits for Farmers

Farmsafe Australia, the national association of agencies with a commitment to reducing injury risk on Australian farms, will work with the Dairy Industries Reference Group to maintain a national program to reduce health and safety risk for dairy farmers, workers, contractors and visitors.

Safety programs in the dairy industry should take into consideration motor vehicle, machinery and accidental fall injury along with injury associated with cattle handling.

There is a need for improved milking and animal handling systems in the dairy industry, where cattle are handled at close proximity.

Dairy farm owners and managers need to ensure that all workers are protected from damaging noise levels.

Further Information

The project was completed in 2007.

Further information on the project is available from the RIRDCwebsite(https://rirdc.infoservices.com.au/collections/fhs) or by contacting Emily Herde at the Australian Centre for Agricultural Health and Safety, University of Sydney.

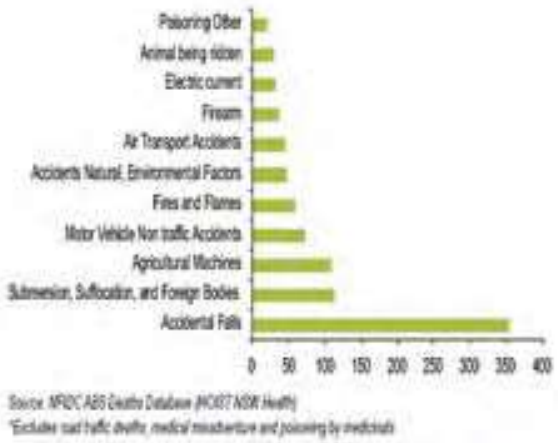
RIRDC Project:

US-141A: 'Occupational Health and Safety Risk in the Australian Dairy industry - The Facts – 2007'

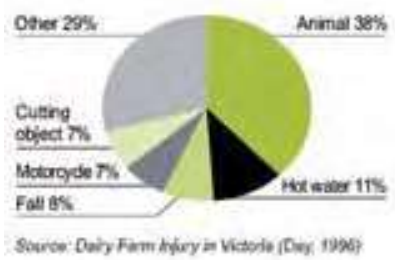
Contact:

Emily Herde
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

Causes of non intentional injury deaths* of farmers and farm workers, Australia 1990-1998 (n=912)* excludes road traffic deaths, medical misadventure and poisoning by medicinals



Common external cause of injury on Victorian dairy farms, 1995 (n=113)



Source: Dairy Farm Injury in Victoria (Day, 1996)

24. Horticulture On-Farm Safety Packages

In Brief

Horticultural production – fruit, vegetable and flower production - is carried out on an estimated 22,460 rural properties in Australia. Horticultural establishments comprise approximately 16% of all Australian agricultural enterprises.

This document has been produced to provide guidance to those agencies and individuals who are working to reduce risk associated with horticultural production in Australia. The publication is available electronically for use by educators and speakers in their efforts to raise awareness and promote horticultural production safety, and for those whose role is the development of public and industry policy to improve safety.

Some Facts

The tables below show details of non-intentional traumatic deaths on farms for the period 1989-1992 there were 20 deaths on Australian fruit producing farms and another 21 deaths on Australian vegetable producing properties.

Deaths were associated with a range of agents, the prime one being the tractor (27% of all deaths).

Although the data below is somewhat dated, the number of deaths of farmers/farm workers showed no downward trend between 1992 and 2001, suggesting that the information is still relevant. The major change during this period has been the increased use of ATVs, which at time of publication are associated with around 10 on-farm deaths per annum across all agricultural sectors.

Tractor safety is a priority for injury prevention programs in the horticultural industry. While the introduction of ROPS (Roll Over Protective Structures) legislation may reduce rollover deaths, runover hazard remains a high risk.

Australia-wide there were 4,316 workers' compensation claims made in the year 2002 for injury in the agriculture sector. Of these, more than 1,378 (32%) were in the horticulture and fruit growing industries.

From the table opposite it can be seen that the largest proportion of workers' compensation claims are associated with use of non-powered hand-tools, appliances & equipment (eg knives, scissors, shovels, spades, fastening packaged/ fastening equipment) and with environmental agencies (eg holes in ground – outdoor, wet oily traffic area, fencing, vegetation, traffic area). Mobile plant and transport are also important (eg tractors, trailers, self-propelled harvesters etc).

Benefits for Farmers

Strategic approaches developed through this research to reduce farm injury risk are multifaceted and include:

- Identifying, elimination and substitution options
- Improving design and engineering solutions
- Administrative or work practice solutions, including education and skills development
- Identification of requirements for personal protective clothing and equipment
- Identification of incentives for adoption of improved systems

Agent of fatal incident on vegetable producing farms, by work status, Australia 1989-1992

Agent	Working	Bystander	Total
Truck/car	3	-	3
Tractor	4	1	5
Tillage seeder		1	1
Posthole digger	1	-	1
Other mobile plant	1	-	1
Electric drill	1	-	1
Other workshop equipment	1	-	1
Forklift	1	-	1
Dam	1	1	2
Embankment	1	-	1
Powerlines	2	-	2
Horse	1	-	1
Snake	1	-	1
Total	**18**	**3**	**21**

Source: Franklin et al. (1989-1992)

Agent of fatal incident on orchards and other fruit farms, by work status, Australia 1989-1992

Agent	Working	Bystander	Total
Trailer	-	2	2
Motorcycle	1	2	3
Tractor	4	2	6
Slasher	-	1	1
Ladder	1	-	1
Firearm	2	-	2
Timber	1	-	1
Dam/irrigation channel	-	5	5
Other farm structures	2	-	2
Total	**10**	**10**	**20**

Source: Franklin et al. (1989-1992)

- Ensuring compliance with regulatory requirements for supply of safe plant and equipment
- Safe operation in the farm workplace

Further Information

The project was completed in 2005.

Further information on the project is available from the RIRDC website or by contacting Associate Professor Lyn Fragar at the University of Sydney.

RIRDC Project:

US-120A 'Health & Safety in the Horticulture industries – A national strategy 2004-09'

Outcomes:

Farmsafe Australia has subsequently produced the publication: *Health and Safety in the Horticultural Industry: An Industry Strategy 2004-2009.*(Hardcopy only – available through RIRDC).

Safety hazards, risk and business plan checklist for packing sheds.

Safety Instruction Information for Horticulture Workers.

Safety Instruction Information for Contractors in Horticulture.

Safety Instruction Information for Seasonal Workers in Horticulture.

Contact:

Associate Professor Lyn Fragar
University of Sydney
Australian Centre for Agricultural Health and Safety
Phone: 02 6752 8210
Email: lfragar@doh.health.nsw.gov.au

Number of workers' compensation claims in the horticulture and fruit growing industries, Australia 1995/96-2000/01

Breakdown Agency	Female	Male	Total
Machinery & (mainly) fixed plant	108	350	458
Mobile plant & transport	256	930	1186
Powered equipment, tools & appliances	35	147	182
Non-powered hand-tools, appliances & equipment	648	1746	2394
Chemicals & chemical products	27	109	136
Materials & substances	224	577	801
Environmental agencies	681	1352	2033
Animal, human & biological agencies	48	122	170
Other & unspecified agencies	520	937	1457
Total	**2547**	**6270**	**8817**

25. Beef Enterprise On-Farm Safety Packages

In Brief

- This document has been produced to provide guidance to those agencies and individuals who are working to reduce risk associated with beef cattle production in Australia
- The publication is available electronically for use by educators and speakers in their efforts to raise awareness and promote beef cattle production safety, and for those whose role is the development of public and industry policy to improve safety

Some Facts

Fatalities: Non-intentional traumatic deaths by work status on beef cattle properties from 1989-1992 revealed that 70 deaths occurred on beef cattle only properties, another 22 deaths occurred on sheep / cattle properties and 12 deaths occurred on beef cattle/cereal grains properties. Deaths were associated with a range of agents, the main ones being aircraft, tractor / mobile plant, motorcycles, vehicles and horses.

Although this data is somewhat dated, the number of on-farm deaths of farmers / farm workers has shown no downward trend between 1992 and 2001, suggesting that this information is still relevant. A major change since that period is the increased use of all-terrain vehicles (ATVs), which at time of publication were associated with approximately 10 on-farm deaths per annum. Priorities for strategies to reduce deaths in the beef cattle industry should include aircraft, motor vehicle, motorcycle and tractor safety.

Injuries: Australia-wide there were 4,316 workers' compensation claims made in the year 2002 for injury in the agriculture sector. Of these, 1,820 (42%) were in the "Grain, sheep and beef cattle" industries.

Separation of claims to the specific beef cattle industry is not available Australia-wide, however the table below shows the number of workers' compensation claims by agents of injury on beef cattle properties in the Northern Territory for the years 1992-1996, where cattle and horse related injury were predominant.

The data below demonstrates the need for improved cattle handling systems in the more extensive beef cattle sector, where approximately 70 workers' compensation claims are submitted per year in the Northern Territory due to injuries associated with animal handling.

Workers' compensation claims associated with road transport in the combined grains / sheep / beef cattle industries for the period 1994/95-1999/00 totalled 1,075 claims. The main transport agents of injury were motorcycles/trail bikes (670 claims) and trucks/semi-trailers (214 claims). This data demonstrates the importance of motorcycle safety, including ATV safety, in the beef cattle industry.

Other agents of injury workers' compensation claims data in the combined grains / sheep / beef cattle industries for the period 1994/95-1999/00 reveal the following:

- Outdoor environment agency of injury totalled 1,417 claims for the period which averages more than 230 per year. The main mechanisms of injury in this category are holes in the ground, traffic areas, fencing materials and vegetation. Attention should be given to maintaining traffic and outdoor areas such as access roads and pathways, where practical, on properties
- Cattle as the agent of injury: 150 claims each year for injuries. The overwhelming mechanism of cattle related injury was being hit by the animal
- Horses were the agent of injury: 160 claims each year for injuries. Injuries associated with horses were predominantly falls from the horse and being hit by the horse

Workers Compensation Claims by Agent of Incident Beef Cattle Properties in the NT 1992-96

Agency	Number
Cattle/horse/other animal	356
Chemical substance	9
Environment	141
Heavy vehicle	30
Light vehicle	41
Machinery fixed plant	12
Material substances	44
Non power equipment	85
Powered equipment	39
Other unspecified	14
Total	**741**

Source: Work Health Authority NT

Again, safe handling systems for cattle and horses are a priority. Head injury accounted for 5 percent of cattle related injury and 7 percent of horse related injury. As more than 90% of horse related deaths are associated with head injury, helmets for horse riders is a key risk control measure to be considered.

Zoonotic Disease: Q fever is a major zoonotic disease risk for the Australian cattle industry and is caused by a bacteria-like organism, Coxiella burnetii, which is highly virulent and infectious. The disease is an occupational hazard for veterinarians, abattoir workers, and people working with animals. Cattle producers and workers in Australia have been shown to be at risk of exposure to Q fever (Fragar 2002).

As Q fever is a disabling condition that may have long-term health impacts, the severity of the risk should generally be regarded as medium to high. Q fever vaccine is available across Australia through state Health Departments.

Benefits for Farmers

The document will result in a greater awareness of risks in the beef cattle industry and a strategic plan to combat these risks.

Further Information

The project was completed in 2005. Further information on the project is available from the RIRDC website or by contacting Associate Professor Lyn Fragar at the University of Sydney.

RIRDC Project:

US-120A 'Managing Beef Cattle Production Safety: A practical guide'

US-120A 'Health & Safety in the Horticulture industries – A national strategy 2004-09'

Outcomes:

Farmsafe Australia has subsequently produced the publication: *Health and Safety in the Australian Beef Cattle Industry - An industry strategy 2004-2009* (Hardcopy only – available through RIRDC).

Safety hazards, risk and business checklist for beef cattle handling systems.

Safety induction information for workers on beef cattle properties.

Safety induction information for contractors to beef cattle properties.

Safety guidelines for safe cattle handling – a practical guide.

Contact:

Associate Professor Lyn Fragar, University of Sydney, ACAH&S
Phone: 02 6752 8210
Email: lfragar@doh.health.nsw.gov.au

26. Sugar and Cotton Sustainable Farm Families

"Without good health you are no good to family or farm productivity. You and your health is the most important and only you can improve it."
Cotton grower participant in the Sustainable Farm Families Program.

In Brief

- In 2003, the Western District Health Service and its collaborative partners undertook a project to investigate farmer health within the broad-acre industries of Victoria, southern New South Wales and eastern South Australia for a period of three years
- This funding was extended in 2005 for two years to pilot an extension of the program to sugar and cotton producers
- The result of this program extension is the report *Living Longer on the Land – Case studies of the Sustainable Farm Families SFF Program in the Sugar and Cotton industries*

Why the Research was Completed

The report provides an insight into the current health status of rural farming families in the sugar and cotton industries which increases our understanding of the factors impacting farming family health and identifies measures to improve farming family health, well-being and safety. Many of the specific strategies to improve farming family health were provided by the farmers themselves.

The report also provides basic statistical information on the transfer and repeatability of the previously successful SFF project. Farm families from the cotton and sugar industries have embraced this project and are now incorporating health, well-being and safety as important business indicators that affect their 'triple bottom line'.

The SFF project was developed in response to the evidence that while there are health statistics regarding rural and metropolitan health, little is known about the health status of farming families (men, women and extended families). The aim of this project was to build on the research from the initial SFF project in broad-acre farming and to create resources to implement the learning in other agricultural industries.

The extension of the SFF project into the cotton and sugar industries has allowed the project to be tested in agricultural industries with different climatic, industrial and social issues. The goal was to develop and trial a program that enabled farmers to increase control over and improve their health, well-being and safety.

Results Achieved

The key question of farm families' current health status was addressed through structured education programs coordinated over a two year period for 63 participating farmers. At the end of the SFF program, participants were asked if the program had made a difference to their health, well-being and farm safety. Participants responded that they:

- Were more aware of their own health and that of their family and had a greater understanding as to how they can maintain good health

- Could see and feel the benefits to their own health. In terms of farm business decisions, participants recognised that if they are healthy they can work longer and more effectively
- Were primarily responsible for their own health, well-being and safety. Many farmers made the connection between health and well-being and farm safety
- Had a greater sense of perspective about the important role of health in their farming family decisions and recognised the need to get the lifestyle mix right – including considerations of family, recreation, work, safety and the need to encourage their children to be involved
- Recognised it is important to talk with others about their problems and concerns in terms of managing stress and general anxiety
- Recognised that small changes in lifestyle, thinking more about their own future, having downtime to attend children's sporting activities and planning to take a holiday previously denied were an essential part of their personal regeneration

The project achieved some very important outcomes and research findings including:

- High retention rates of participants
- Positive retention of knowledge by participants gained through the education process
- Statistically significant reduction of clinical indicators correlating to major diseases such as cardiovascular disease and type 2 diabetes
- Increased use of protective aids and equipment

- Positive lifestyle changes consistent with action planning by participants to commit to family holidays, and other stress reduction activities
- Recommendation of the program to other farming families by 100 per cent of participants

Benefits for Farmers

Key recommendations from this project mirror those of the original SFF program and are:

- The Australian government fund a national SFF program to establish regional partnerships with rural and regional health services
- The SFF program be included in the annual health promotion plan of rural and regional community health services with ongoing financial support from the Australian government
- Future SFF programs be structured around partnership arrangements with institutions and organisations in health, government, industry, education and community
- The evidence-based approach remains a cornerstone of the SFF project as it is adopted by rural and regional health services across Australia
- The Australian government work with the Western District Health Service to fund a five year program to implement the previous recommendations in the report

Further Information

The project was completed in 2008.

Further information of the project is available from the RIRDC website or by contacting Susan Brumby and Stuart Willder at the Western District Health Service, Hamilton VIC or Professor John Martin at La Trobe University, Bendigo VIC.

RIRDC Project:

WDH-2J Living Longer on the Land: Case studies of the Sustainable Farm Families Program in the Sugar and Cotton industries

Outcomes:

Many conference papers have been published and numerous media articles have been printed. Two annual newsletters were sent to participating farmers and these were also made available on the SFF website. The FSS website commenced March 2006 (www.sustainablefarmfamilies.org.au).

Contact:

Susan Brumby, Stuart Willder or Professor J Martin

Phone: 03 5551 8450
Email: susan.brumby@wdhs.net
stuart.willder@wdhs.net
John.Martin@latrobe.edu.au

Still from the Sustainable Farm Families website

27. Grain Production and Handling OH&S Folder

In Brief

- This forthcoming publication will provide a practical management tool for implementing OH&S in the grain production and handling workplace
- The publication will be available shortly on the Farmsafe Australia website

Why the Research was Completed

This publication aims to provide a practical guideline for grain producers, managers and workers to improve the safety of those who work with or are in the vicinity of areas where grain production and grain handling are being undertaken.

The document briefly gives guidance on the hazards and risks associated with grain production and handling in the farm setting, and practical guidelines on how to implement effective occupational OH&S risk control that will not only reduce or prevent injury, but will assist grain producers to meet OH&S regulatory requirements.

Benefits for Farmers

Grain production enterprises should use this document in association with the Managing Health and Safety in the Grain Industry risk management package – a practical management tool for implementing OH&S in grain production and handling workplace – available on the Farmsafe Australia website www.farmsafe.org.au. The guideline has been prepared under the direction of the Farmsafe Australia Grain Production Safety Reference Group.

Further Information

This project will be completed in 2009.

Further information is available on the Farmsafe Australia website www.farmsafe.org.au.or by contacting John Temperley at the Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-141A: Grain Handling Folder

Publication:

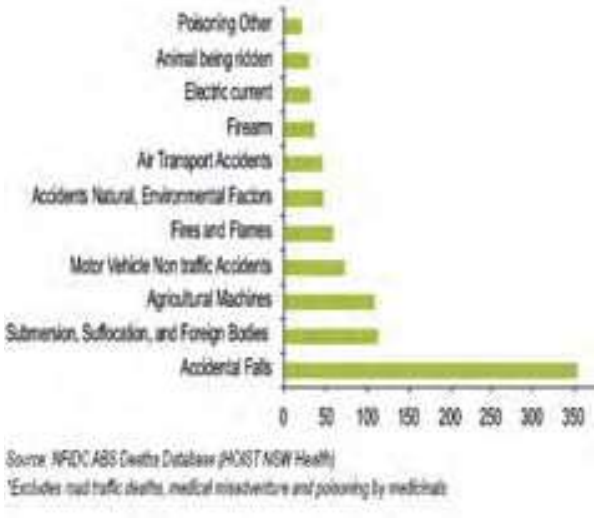
Managing Health and Safety in the Grain Industry risk management package – a practical management tool for implementing OH&S in grain production and handling workplace.

Contact:

John Temperley Centre for Agricultural Health and Safety, University of Sydney.
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

Falls, including falls from farm silos are a common external cause of injury on Australian grain farms

Causes of non intentional injury deaths* of farmers and farm workers, Australia 1990-1998 (n=912) * excludes road traffic deaths, medical misadventure and poisoning by medicinals



28. Poultry Industry OH&S Risks

In Brief

- This report presents facts and figures on the risks involved in the Australian poultry industries
- The poultry industries consist of the chicken meat industry, the egg laying industry and a series of smaller industries (eg turkey, duck and quail production)
- The poultry industries have one of the lowest death rates of all major Australian agricultural sectors
- Most poultry accidents occur in association with manual handling tools and equipment, environmental, animal, human and biological agents

Why the Research was Completed

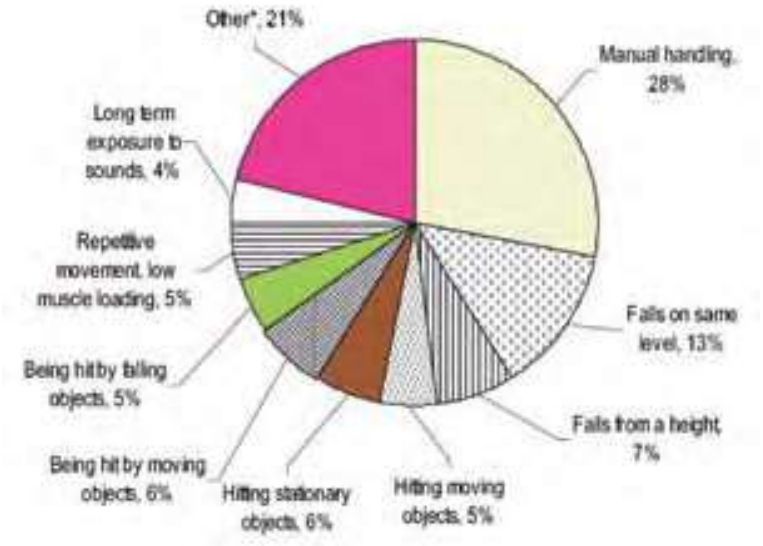
The report was produced to provide guidance to those agencies and individuals who are working to reduce risk in the poultry industry. It is also targeted at educators and developers of public and industry policy to improve farm safety.

Results Achieved

The key findings are as follows:

- Data compiled by Franklin et al 2001 for the years 1989 to 1992 shows that there was only one non-intentional traumatic work-related death on an Australian poultry farm
- Analysis of fatal workers' compensation claims in various agricultural industries for the period 1994/95 to 1999/00 and 2001-2003 shows there were a total of seven deaths over nine years
- The poultry industry has one of the lowest death rates per annum of all the listed industries. This equates to 0.8 deaths per annum to produce $1,508 million gross value product (eggs and meat)
- Most poultry accidents occur in association with manual handling tools and equipment, environmental, animal, human and biological agents (see figure below)

Mechanisms of injury in NSW poultry farming employees



Benefits for Farmers

To further enhance OH&S in what is already a safe industry the following strategic approaches are suggested:

- Identifying, eliminating and substituting injury risks
- Improving design and engineering solutions
- Administrative or work practice solutions, including education and skills development
- Identification of requirements for personal protective clothing and equipment
- Identification of incentives for adoption of improved systems
- Ensuring compliance with regulatory requirements for supply of safe plant and equipment and safe operation in the farm workplace

Further Information

The project was completed in 2005.

Further information on the project is available from the Farmsafe Australia website www.farmsafe.org.au. or by contacting Associate Professor Lyn Fragar, Kirrily Pollock or Christine Morton at the Australian Centre for Agricultural Health and Safety, University of Sydney.

RIRDC Project:

US-121A 'Occupational Health and Safety Risk in the Australian Poultry Industry' Publication No. 05/052

Contact:
Associate Professor Lyn Fragar
Phone: 02 6752 8210
Email: aghealth@health.usyd.edu.au

Policy, Planning, Future Research

29. Incentives for Good OH&S Practice

In Brief

- The research reports on options for improving the adoption of on-farm hazard management practices
- The study looked at accreditation schemes as a mechanism to encourage farmers who take OH&S training to implement safety measures
- The best potential for improving incentives to farmers was identified as discounts on workers' compensation and public liability insurance
- Governments will need to think more carefully about how best to assist farmers with adoption of good OH&S practices, as a market based solution is not currently viable

Why the Research was Completed

The research was commissioned to explore the potential to promote the adoption of the Farmsafe Accredited Farm status through developing options that increase the incentives/ decrease the costs for farmers to establish a Farmsafe accredited farm.

Results Achieved

The following options were developed for evaluation:

- Discounts on insurance such as workers' compensation and public liability for accredited farms
- Market access and price premiums for products from accredited farms
- Discounts on other farm inputs for accredited farms or other support
- Collaborative programs with other accreditation schemes as a mechanism for reducing the costs of accreditation

Based on discussions with industry, government and research agencies it was clear that, for Australia, farm OH&S is considered to be adequate without accreditation and so market access is not likely to be made contingent on any accreditation scheme in the foreseeable future.

Discounts on farm inputs other than insurance and sponsorship by agribusiness were mechanisms seen to work best for mitigation of specific hazards such as use of helmets for riding and fencings of farm household yards for child safety. There are challenges with integration with other accreditation programs.

The insurance discount option had considerable appeal in that it could offer a real and immediate incentive to farmers for adopting good OH&S practices as indicated by their accreditation.

Interviews were conducted with eight insurance companies seeking their interest in a premium discount scheme for workers' compensation and public liability insurance. While there was universal support for the concept of accreditation there was little interest, especially in workers' compensation insurance, in individual discounts based on accreditation. In general insurers preferred to offer experience based rating systems, rewarding farmers for a good claims history than for preventative measures.

The study concluded that market based incentives would at best encourage farmers who are already contemplating training and implementation of good OH&S to proceed. It was not clear that they would want to go to the next step of accreditation given the high cost of direct benefit ratio of accreditation.

Benefits for Farmers

Governments will need to think more carefully about how best to assist farmers with adoption of good OH&S practices, as a market based solution is not currently viable.

Further Information

The project was completed in 2004.

Further information on the project is available from the RIRDC webpage (https://rirdc.infoservices.com.au/items/04-103) of by contacted the Centre for International Economics (CIE).

RIRDC Project:

US-121A 'Occupational Health and Safety Risk in the Australian Poultry Industry' Publication No. 05/052

Contact:

Centre for International Economics, Canberra
Phone: 02 6248 6699
Email: info@thecie.com.au

State based work cover authorities operate in partnership with their communities to achieve safe work places, effective return to work and security for injured workers

30. Future Health and Safety Research

In Brief

- This project reviews research completed by the Farm Health and Safety Joint Research Venture between 2001 and 2006
- A subsequent publication by the same authors suggests R&D priorities for the period 2008 to 2012
- Future R&D in this area will include Australian fishing industry research

Why the Research was Completed

The report summarises and evaluates the effectiveness of research funded by the Joint Research Venture for Farm Health and Safety (2001-2006).

The report is aimed at institutional investors in farm health and safety, at evaluators of the effectiveness of farm health and safety programs and at health professionals and researchers interested in farm health and safety.

The Farm Health and Safety Joint Research Venture (FHS Joint Venture) was managed by RIRDC within the Human Capital, Communication and Information Systems Program. The FHS Joint Venture came to an end in June 2006. It had a budget of $1.78 million over the five years, and funded 20 research projects which produced more than 40 research reports.

As part of the development process for a new collaborative partnership, the impact of the 2001-2006 program needed to be quantified. This process includes an economic evaluation of impact of selected investments in the form of cost-benefit analysis.

The objectives of this research were to summarise the work undertaken by the Joint Research Venture for Farm Health and Safety, to undertake a detailed cost-benefit analysis of three of the projects and to report on the evaluation to the funding partners.

Results Achieved and Benefits for Farmers

The following conclusions are drawn from the impact evaluation:

- The program has largely met the objectives identified in its Strategic Plan (2001-2006)
- The impact of many of the individual projects funded has been difficult to assess due to a lack of data on how and where the outputs of the research have been used and their impact on behaviour. This means it is difficult to make assessments of the degree to which projects have contributed to any reduction in risk of death or injury from certain activities on-farm
- Information was lacking on the costs additional to the research (training, promotion etc) that would have been incurred in realising any potential benefits

Given the assumptions made, the projects for which benefits have been valued show that the potential returns to research in this area are likely to be significant. Reducing the probability of death or injury by only a small amount can result in extremely high benefits.

A second piece of work by Peter Chudleigh and Sarah Simpson of Agtrans Research used the findings from the impact evaluation and a FHS Joint Venture workshop to suggest future priorities for fishing and farming health and safety research.

Future priorities were identified in five areas as follows:

- Primary producer, employee and family mental health (including rural depression)
- Primary producer, employee and family physical health
- Primary producer, employee and family safety (including child safety, road safety, safety equipment, personal farm safety devices, designing workflow, pesticides and chemicals)
- Demographic changes and their implications for health and safety (risks, modelling, transient workforce, impact of new industries on social structure and peri-urban specific risks)
- Health and safety service delivery and primary producer attitudes (including how to get participation in health programs)

Further Information

The project was completed in 2008.

Further information on the project is available from the RIRDC website, by contacting RIRDC or the researchers – Peter Chudleigh or Sarah Simpson at Agtrans Research.

RIRDC Project:

AGT-11A 'Farm Health and Safety Joint Research Venture - Impact Evaluation'

AGT-12A 'Collaborative Partnership for Farming and Fishing Health and Safety – Research and Development Plan 2008-2012'

Contact:

Dr Peter Chudleigh or Sarah Simpson
Phone: 07 3870 4047
Email: info@agtrans.com.au

Farm Health and Safety Research Compendium 20

by Michael Clarke

Pub. No. 09/065

This compendium reflects the major research themes associated with the Collaborative Partnership for Farming and Fishing Health and Safety R&D Plan 2008-2012. These include farm safety and the physical and mental health of farm and fishing families.

The compendium provides easy to read information to assist farmers and their service providers understand the purpose of the research completed by the program, the outcomes of each project, communication of results, the research implications for industry, the key benefits and how to contact the researchers to access further information.

The Rural Industries Research and Development Corporation (RIRDC) manages and funds priority research and translates results into practical outcomes for industry. Our business is about developing a more profitable, dynamic and sustainable rural sector.

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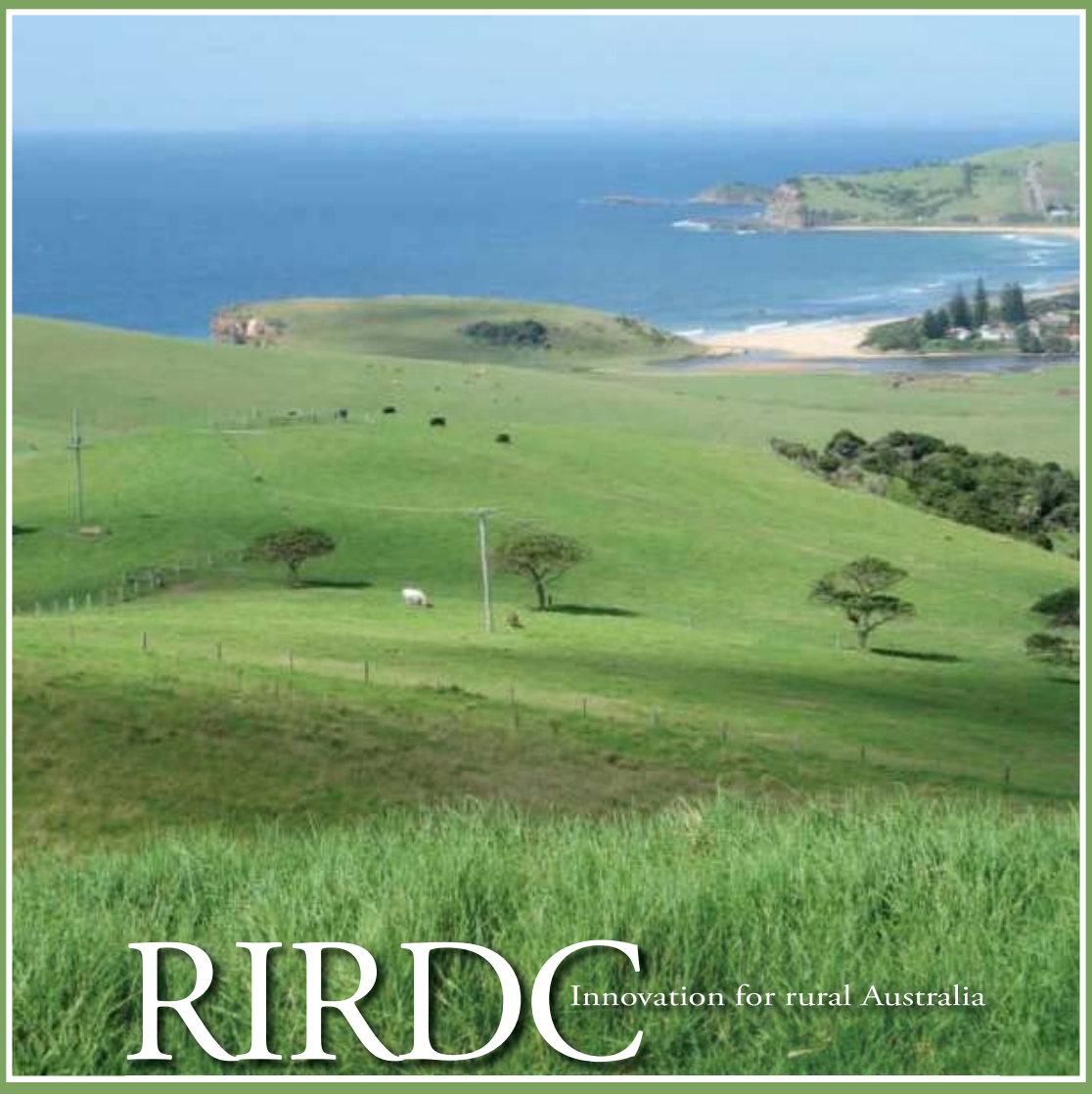

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COLLABORATIVE PARTNERSHIP FOR FARMING AND FISHING HEALTH AND SAFETY

RIRDC Completed Projects in 2009 - 2010 and Research in Progress as at June 2010

RIRDC Publication No. 10/097

COLLABORATIVE PARTNERSHIP FOR FARMING AND FISHING HEALTH AND SAFETY

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Publication No 10/097

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Foreword

RIRDC produces Research in Progress summaries of continuing projects and those completed during 2009-2010. Our intention is to provide stakeholders with early access to the results of ongoing and completed work to inform their decisions, and inform researchers of results to shape research directions.

The Collaborative Partnership for Farming and Fishing Health and Safety Research in Progress June 2010 contains short summaries of continuing projects as well as those that were completed during 2009-2010. This Program aims to undertake R&D and research application activities that improve the:

- Physical health of farming and fishing workers and their families
- Mental health of farming and fishing families
- The safety of the work environment and practices in farming and fishing industries.

This report is an addition to RIRDC's diverse range of over 2000 research publications which are available for viewing, free downloading or purchasing online at www.rirdc.gov.au. Purchases can also be made by phoning 1 300 634 313.

Craig Burns
Managing Director
Rural Industries Research and Development Corporation

Contents

Project Title	Interventions for best practice health and safety behaviour change - Stage 1
RIRDC Project No.:	PRJ-004599
Start Date:	26/06/2009
Finish Date:	30/06/2010
Researcher:	Lyn Fragar
Organisation:	The University of Sydney
Phone:	02 6752 8212
Fax:	02 6752 6639
Email:	lfragar@health.usyd.edu.au
Objectives	To support the Collaborative Partnership for Farming and Fishing Health and Safety to achieve its three objectives relating to safety, physical and mental health in the farming and fishing industries by: 1. Identification of all research and project evaluation reports of farm and fisheries safety, health and mental health programs of relevance to Australian farmers and fishers 2. Review of the strength of evidence for effectiveness, and findings of relevance to achieving changed behaviour 3. Defining with the Collaboration the form in which features of effective interventions should be presented in order to inform Stage 2 of this Project 4. With the Collaborative Partnership, establishment of an informal Australian Farm and Fishing Health and Safety Research Network of rural research institutions to develop research capacity in this field, and assist these to tender for projects in Stage 2. 5. Submission of a review report of that describes the features of effective interventions that maximise behaviour and practice change towards improved farming and fishing physical and mental health and safety, and that provides the information and resource base for Stage 2.
Background	Safety and health of the people engaged in agricultural and fishing production has been of concern to Australian governments and relevant industries for over two decades. This research report extends the evidence base regarding effective interventions and adoption in relation to the farming and fishing industries. Specifically, it aligns with the objectives of the Collaborative Partnership for Farming and Fishing Safety addressing physical and mental health, along with the safety environment and work practices. The findings of this report will assist the Collaborative Partnership for Farming and Fishing Safety to undertake the necessary work that will inform a program of farm and fishing health and safety programs that are underpinned by “best practice”.
Research	Building on two earlier reports completed in 2008, a follow-up literature review was completed as a desk study. Findings were tabulated as an updated review that included a list and description of all programs included in the reviews, by intervention type, along with exclusions and reasons for exclusion; for each program the level of evidence for outcomes; and for each reported program, a description of key features of effectiveness contributed by each report. A workshop was hosted with the Program and Advisory Committee of the Collaborative Partnership for Farming Fishing Health and Safety. Recommendations were developed for the Collaborative Partnership for Farming Fishing Health and Safety.
Outcomes	This study has identified relevant promotion and extension programs. It identified the strengths of programs in attracting participation, in raising awareness and knowledge and in driving behaviour change on farm or fishing enterprises. It has endorsed 10 key principles that should underpin safety

	promotion programs to optimise the likelihood of adoption. Future research should focus on: 1. Reviewing, monitoring and setting benchmarks and priorities for action 2. Formal support to and evaluation of national campaigns and programs 3. Grain auger guarding and retro-fitment 4. Quad bike safety 5. Helmet wearing promotion program 6. Safety of older farmers program 7. Setting the Research and Development agenda for the fishing industries.
Implications	The major recommendations are directed to the Collaborative Partnership for Health and Safety in Farming and Fishing in the first instance and include: 1. That the Collaborative Partnership consider the findings and recommendations of this report and, develop a national strategic plan for effective promotion of safety on Australian farms. 2. That the Fisheries Research and Development Corporation, in association with the Collaborative Partnership, consider the findings of this study and develop capacity to support development and maintenance of a national plan for fishing safety. 3. That the specific research and development corporations develop an annual plan of promotion of safety to members, ensuring timely advice in relation to seasonal production activity. 4. That the industry agencies actively support national single-issue safety campaigns. 5. That the Collaborative Partnership prepare a paper to be submitted to, the Minister for Health and Ageing to indicate the importance of inclusion of farming and fishing populations in preventive health programs to be delivered by Primary Health Care Organisations and state-based programs. Mechanisms to ensure inclusion will need to be defined. 6. That the Collaborative Partnership support programs aimed at improving mental health literacy, access to mental health services and management of business stress in the farming and fishing sectors. 7. That the ACAHS revise its draft Guideline for achieving change on farms.
Publications	Will be prepared.

Research in Progress - FFHS-To improve the physical health of farming and fishing workers ad their families

Project Title	Sustainable Farm Families- Future Directions
RIRDC Project No.:	PRJ-003083
Start Date:	30/05/2009
Finish Date:	31/03/2011
Researcher:	Susan Brumby
Organisation:	Deakin University
Phone:	(03) 5551 8460
Fax:	(03) 5572 5371
Email:	susan.brumby@wdhs.net
Objectives	The Sustainable Farm Families - Future Directions (PRJ-003083) focuses on extending our understanding of the initial SFF program implemented in the broad acre industry (2003-2006) in a longitudinal study. To note this was a recommendation of the report Living Longer on the Land – an economic evaluation of the Sustainable Farm Families Program undertaken by Boymal et al (2007). We will focus on the following objectives by revisiting the ten original groups (Clare, Hamilton x 2, Swan Hill, Benalla and Horsham) of the SFF program and (Wee Waa, Dalby, Ayr and Ingham for Cotton and Sugar) assess the health, (physical and mental) and safety status of the 192 (expecting 160 available) participants to further extend the understanding and efficacy of the SFF program post commencement within these industries. Objectives • •To consider the long term benefits (health gain, equity and empowerment) from the SFF program on the individual, the farm the family • •To measure and evaluate if their clinical improvements have been maintained and to gather evidence about their morbidity or mortality • •To evaluate the acquired skills, knowledge and change in behaviour associated with completing the first program • •To communicate project findings to both participants and industry.
Current Progress	Sustainable Farm Families - Future Directions (PRJ-003083) focuses on extending our understanding of the initial SFF program implemented in the broad acre industry (2003-2006) in a longitudinal study. All partner contracts with La Trobe University and Farm Management 500 have been signed off and ethics approval granted. The project has written the year 5 / 6 workshop and manual chapters which included respiratory health and pesticides as well as focus groups on climate. All original participants have been contacted via email, phone or letter. In some cases all three methods have been used. Ten workshops have been held in all the nominated locations and were completed by week ended May 14, 2010. Some participants are being further followed up to assist in collecting their physical assessment data. Response and participation rates have been high with workshops well attended and supported. The Cotton programs in Wee Waa and Dalby were affected by the southern Queensland flooding and state of emergency. However, all participants have received a newsletter and articles and promotion have been undertaken through Farm Management 500 and the Cotton Research Development Corporation in particular.

Research in Progress - FFHS-To improve the physical health of farming and fishing workers and their families

Project Title	Staying healthy: Behaviours and services used by farmers and fishers
RIRDC Project No.:	PRJ-003524
Start Date:	19/09/2008
Finish Date:	13/07/2012
Researcher:	Sue Kilpatrick
Organisation:	Deakin University
Phone:	03 5563 3138
Fax:	03 5563 3081
Email:	pvcrr@deakin.edu.au
Objectives	The project's objective is to investigate the process by which farmers and fishers achieve and maintain good physical and mental health in 'difficult times' (defined in Background section). Research questions are: 1. How do farmers and fishers stay healthy in difficult times? • What behavioural choices do they make that protect/enhance their health? • What is the influence of availability, nature and location of services? • What other factors, including attitudes influence their decision making process? 2. What would help farmers and fishers to stay healthy in difficult times? • What individual level information, resources or actions would assist? • What community level infrastructure or actions would assist, including, but not limited to, health and wellbeing services?
Current Progress	Five study sites representing five different industry areas selected, with input from the project reference group: Kerang, Vic (mixed farming); western Bland Shire, NSW (grains), St George, Qld (cotton), Ingham, Qld (sugar) and Jurien Bay, WA (fishing). Audit of health and wellbeing services in each site conducted. Interview participants recruited from each site, and interviews conducted from Feb to April 2010. Selected participants agreed to keep health journals for three months - this data collection is ongoing. Literature review ongoing.

Research in Progress - FFHS-To improve the safety environment and work practices in farming and fishing industries

Project Title	OH&S Baseline data survey of Australian Fishing Industry
RIRDC Project No.:	PRJ-005591
Start Date:	09/04/2010
Finish Date:	30/10/2010
Researcher:	Kate Brooks
Organisation:	KAL Analysis Pty Ltd
Phone:	03 9917 2665
Fax:	
Email:	Kate@kalanalysis.com
Objectives	The objective of research project is to provide a frame of reference for the data analysis; a thorough analysis of the existing data in the context of interventions; a detailed comparison of State data where interventions have and haven't occured to quantitatively identify the effectiveness of them; and to inform the industry of the status of Fisheries OHS over the last 12 years, the effect of interventions, and to identify what further actions are necessary to either investigate ongoing problems or address awareness lapses amongst industry participants.
Current Progress	The initial literature review has been completed, identifying State and Federal government reports, government research, industry reports and academic research into Australian fishing and commercial vessel occupational health and safety issues. The review confirmed that, while fishing and agriculture are in the top three most hazardous industries in which to work, and that 80% of accidents that occur in commercial fishing are not covered by any OHS or workers compensation agency, the OHS status of the industry has been improving in the last ten years. It identified the key factor in 70% of fatalities as being the low level of adoption for wearing PDFs (Personal Flotation Devices or lifejackets) at all times while away from the dock. In regard to injuries, the key factor is most commonly identified as the lack of training emanating from a culture that does not value workplace safety. Other factors were also identified, but were of lesser importance in the hierarchy of contributing factors, such as alcohol and fatigue. The review also identified interventions that are indicated as likely to have had an effect on the incidence of fatalities and injuries in the industry. Seven events or factors which, to varying degrees, were identified that can reasonably be expected to have had some effect on the OHS status of the industry. These included legislative events (introduction of quotas and safety legislation), establishment of OHS strategies and codes of practice, and industry communications programs.

Research in Progress - FFHS-To improve the safety environment and work practices in farming and fishing industries

Project Title	OH&S Practices on Australian Farms
RIRDC Project No.:	PRJ-005593
Start Date:	13/04/2009
Finish Date:	31/08/2010
Researcher:	Milly Lubulwa
Organisation:	Australian Bureau of Agricultural and Resource Economics
Phone:	6272 2069
Fax:	6272 2318
Email:	milly.lubulwa@abare.gov.au

Objectives

To conduct a telephone survey to collect information on current practices of farms aimed at improving the physical and mental health of farm workers and their families.

Specifically the main objectives of the project are to collect information on:

- the adoption of OH&S practices on agricultural farms;
- the extent of knowledge possessed by farm operators about OH&S practices;
- the proportion of farm workers exposed to OH&S hazards; and
- the incidence of mental health risk among farm managers and workers.

The main objective of the proposed survey is to collect data from farm operators on:

- Physical health, including incidence of injuries, accessibility of health services and the proportion undertaking an annual health check.
- Mental health, including social inclusion and incidence of pressure/stress.
- Safety, including measurement of OH&S management practice uptake, incidence of injury and death, and exposure to known hazards.

The survey will also obtain data on the characteristics of farms and farm managers, including enterprise type, number of households on farm, number of residents by age group and number of workers. The questionnaire will be finalised in consultation with RIRDC.

Current Progress

Fieldwork for the survey began in April 2010 and was completed in June 2010. The target sample for the 2009 survey was 700 farms across Australia. Of these, 651 have been successfully completed:
New South Wales: design - 144, completed - 139
Victoria: design - 100, completed - 98
Queensland: design - 149, completed - 133
South Australia: design - 81, completed - 79
Western Australia: design - 88, completed - 78
Tasmania: design - 79,completed - 75
Northern Territory: design - 72, completed - 49
Australia: design - 713, completed - 651

Preliminary estimates have been generated by state and by industry and are ready to be sent to RIRDC in the form of excel tables on 30 June 2010. Any other requirements for analysis or reporting may be identified after further discussion with RIRDC. We will be generating final estimates when benchmarks are received from the ABS and weighting is conducted. Any additional responses that come in will also be incorporated at this time. It is expected that final estimates will be provided to RIRDC by the end of July.

It is recommended that estimates at this stage be treated as preliminary, pending the weighting process.

COLLABORATIVE PARTNERSHIP FOR FARMING AND FISHING HEALTH AND SAFETY

RIRDC Publication No. 10/097

The Collaborative Partnership for Farming and Fishing Health and Safety Research in Progress June 2010 contains short summaries of continuing projects as well as those that were completed during 2009-2010. This Program aims to undertake R&D and research application activities that improve the:

- Physical health of farming and fishing workers and their families
- Mental health of farming and fishing families
- The safety of the work environment and practices in farming and fishing industries.

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RIRDC Completed Projects in 2008 - 2009 and Research in Progress as at June 2009

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Collaborative Partnership for Farming & Fishing Health & Safety

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***RIRDC R&D Projects completed in 2008-09 and Research in Progress as at June 2009* - Collaborative Partnership for Farming & Fishing Health & Safety**

Publication No 09/116

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- to inform researchers of results to shape research directions.

The complete report on all programs is on our website at http://www.rirdc.gov.au

The Collaborative Partnership for Farming and Fishing Health and Safety *Completed Projects in 2008– 2009 and Research in Progress at June 2009*, contains short summaries of continuing projects as well as those that were completed during 2008 – 2009. This program aims to improve:

- the mental health of farming and fishing families
- the safety environment and work practices in farming and fishing industries
- the physical health of farming and fishing workers and their families

Funding for the Collaborative Partnership comes from RIRDC, Australian Government of Health and Ageing, Grains R&D Corporation, Fisheries R&D Corporation, Sugar R&D Corporation and Cotton R&D Corporation.

This report is an addition to RIRDC's diverse range of over 1800 research publications, which are available for viewing, downloading or purchasing online through our website: www.rirdc.gov.au. Purchases can also be made by phoning 1300 634 313.

Peter O'Brien
Managing Director
Rural Industries Research and Development Corporation

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1.1 Collaborative Partnership for Farming & Fishing Health & Safety – COMPLETED PROJECTS

Completed Projects - FHS-To improve the metal health of farming and fishing families

Project Title	Farm & Fishing Research Compendium
RIRDC Project No.:	PRJ-004532
Start Date:	13/03/2009
Finish Date:	4/01/2013
Researcher:	Michael Clarke
Organisation:	AgEconPlus Pty Ltd
Phone:	(02) 9817 5888
Fax:	(02) 9816 4840
Email:	clarke@ageconplus.com.au
Objectives	Provide a plain English review of research completed since 2002
Background	The Joint Venture in Farm Health and Safety was supported by R&D corporations – Rural Industries Research and Development Corporation (RIRDC), Grains Research and Development Corporation (GRDC), Meat and Livestock Australia (MLA), Australian Wool Innovation (AWI), Cotton Research and Development Corporation (CRDC), Sugar Research and Development Corporation (SRDC), Dairy Australia (DA) and Horticulture Australia Limited (HAL). The successor program includes Fisheries Research and Development Corporation (FRDC).
Research	In selecting R&D projects for the new Farming and Fishing Health and Safety Collaborative Partnership 2009-2012, a wide range of concerned stakeholders were consulted. Projects identified as a result of this process included a 'plain English' compendium of recent research and this document is a result of that request. It outlines the valuable work completed by the Joint Venture in Farm Health and Safety between 2002 and 2008 and is an important tool in the dissemination of research results.
Outcomes	The research compendium details the results from thirty research projects and chapters are presented in the following order: o Australian farm health and safety in overview; o Protecting vulnerable farm persons; o Addressing specific farm hazards; o Industry specific farm health and safety risks and responses; and o Policy, planning and future research. Most projects address farm safety issues.
Implications	The compendium reflects the major research themes associated with the Collaborative Partnership for Farming and Fishing Health and Safety R&D Plan 2008-2012. These include farm safety and the physical and mental health of farm and fishing families. The compendium provides easy to read information to assist farmers and their service providers understand the purpose of the research completed by the program, the outcomes of each project, communication of results, the research implications for industry, the key benefits and how to contact the researchers to access further information. Research and development is pointless on its own unless it is communicated convincingly to a receptive audience of those who are actively engaged in primary production. It is for this reason that the compendium has been produced.
Publications	The compendium will be published by RIRDC in May 2009.

Completed Projects - FHS-To improve the physical health of farming and fishing workers ad their families

Project Title	Farm safety studies
RIRDC Project No.:	PRJ-000541
Start Date:	15/10/2005
Finish Date:	23/12/2008
Researcher:	Lyn Fragar
Organisation:	The University of Sydney
Phone:	(02) 6752 8212
Fax:	(02) 6752 6639
Email:	lfragar@health.usyd.edu.au
Objectives	To establish the parameters for researching enterprise OHS risk factors and personal health related to work and life in agricultural production The output from this project will be in terms of reports and published papers specifically - (i)Technicalreports for publication and posting on the RIRDC website: Australian Farm Fatalities (July 2000 to December 2004) Farm Injury Optimal Dataset Occupational Health and Safety on farms in Australia Older Farmers and Sugar Cane Chartbooks and updatedversions of existing Chartbooks Practical Guidelines publications Mental health and wellbeing and its impact on farms in Australia (ii)Published papers in peer-reviewed professional journals (iii)A Translation Plan to be developed in association with Farmsafe Australia to ensure that relevant findings are integrated with current OHS programs and rural health service plans that will include: a)Short reports in lay language for use in newsletters and websites b)Presentations at relevant conferences and industry forums (iv)Publication of Sugar Cane package (v)Report of perceptions attitudes and behaviours of participants in longitudinal study (vi)Report on pathways to adoption of OHS on farms
Background	The Rural Industries Research and Development Corporation has had active part to play in development of the evidence -base for the farm safety programs in Australia, and, with other rural research and development corporations , has invested in development of resources and guidelines for use on-farm by farmers who are managing their safety risk in a systematic way. However, further progress with improving safety on Australian farms requires a better understanding of the pathways to adoption of safety measures on farms
Research	This research report describes the findings of a review into pathways for adoption of safety on Australian farms that is based on review of effective farm safety programs in Australia and of research into factors affecting adoption of safety measures on Australian farms. The research has reviewed the major safety programs that have been demonstrated to have been effective, has examined research reports relating to factors affecting adoption of safety on Australian farms, and has developed a Model for Adoption of Safety on Australian Farms that will be useful for development of future programs and campaigns. Principles have been developed that should guide design of effective safety programs
Outcomes	The following principles have been identified as contributing to effective programs aiming to assist farmers to adoption safety measures on Australian farms: 1. Programs must consider the necessary and potentially sufficient factors to ensure farmers can take the recommended safety action, by: 2. Programs must identify and address

	factors that contribute to effectiveness in achieving action by individual farmers 3. Industry associations and organisations have key roles to play to ensure adoption of safety on Australian farms 4. Governments have roles to play in partnership with industry to ensure adoption of safety on Australian farms 5. Local community action groups and community organisations have roles to play to promote adoption of safety on Australian farms 6. Empowerment and participatory research continues to be the most relevant manner of development of innovations, strategies, programs and approaches to improve farm safety in Australia
Implications	These findings, if taken up by policy makers and those designing farm safety programs, have the potential to increase the adoption of safety by Australian farmers.
Publications	Pending.

Completed Projects - FHS-To improve the physical health of farming and fishing workers ad their families

Project Title	Effectiveness of risk control measures to reduce occupational exposure to pesticides
RIRDC Project No.:	PRJ-000542
Start Date:	1/04/2007
Finish Date:	29/04/2009
Researcher:	Lyn Fragar
Organisation:	The University of Sydney
Phone:	(02) 6752 8212
Fax:	(02) 6752 6639
Email:	lfragar@health.usyd.edu.au
Objectives	To assist farmers in Australian agricultural industries to effectively reduce risk of harmful exposure to pesticides by investigating and reporting on: 1 How well label safety instructions of pesticides registered for use in Australia align with best practice in OHS risk management 2 How well pesticides handlers in key industries comply with label specifications for safety and what are the impediments to compliance 3 The availability and accessibility to farmers of the range of effective personal protective clothing and equipment for use when handling pesticides
Background	Pesticides are registered for use in Australia by the Australian Pesticides and Veterinary Medicines Authority (APVMA), the statutory authority established under state and federal legislation to assess pesticide products to ensure that registration and use of these products would not pose significant risk to public health, to the environment, to trade or to workers. That system results in safety directions for use being included in label instructions for each pesticides registered for use. These directions invariably depend on use of Personal Protective Equipment (PPE) use by individual handlers to ensure safety. Occupational health and safety (OHS) of handlers is the responsibility of farmers and employers under states' OHS Acts and accompanying Hazardous Substance. Best practice in OHS risk management requires systems to be in place according to the 'hierarchy of effectiveness of risk control', and this involves improved transfer, mixing and application systems that do not depend on use of PPE by individuals. These 2 systems of risk control need to be mutually supportive, and there is need for improvement.
Research	The research was undertaken as three separate studies: 1. A desk study that sampled 300 labels of pesticides that are hazardous substances and mapping alignment of regulatory safety instruction for these pesticide products against OHS best practice ct- Field data collection with CWA branches of availability of key PPE in rural communities 2. Survey of all rural retailers in rural communities by members of Country Women's' Association branches to determine of availability of key PPE in each township. 3. Focus group research of farm chemical users across Australia to determine key factors associated with compliance with regulatory safety instructions
Outcomes	Three very different, but complementary, studies have been undertaken that shed light on the key practical problems faced by Australian farmers and rural pesticides handlers in ensuring protection from exposure to pesticides that are deemed to be hazardous substances under OHS

	regulatory definitions . These difficulties are associated with: • Difficulty in accessing relevant information about health and safety risk • Supply of pesticides in hose design results in splashing and contamination when pouring • Non-standardisation of Camlock fittings for those using closed transfer from larger containers • Inconsistent stocks of PPE by local rural retailers • Inadequate information about which masks, respirators and filters are effective for pesticides use. • Access to gloves that are suitable for the work being undertaken • Requirement to acquire current MSDS that have no practical utility for farmers' health and safety programs
Implications	Recommendations from this project are primarily directed to regulatory authorities of Commonwealth and state governments of Australia, and relate to action that can be taken to improve information available to farmers to improve their safe practice relating to reduction in exposure to pesticides. The studies also report action that can be taken by farmers and suppliers of pesticides and PPE.
Publications	Three papers will be submitted relating to the three studies. A paper has been accepted for publication by the Australia New Zealand Journal of Occupational Health and Safety: Killiey, J., Temperley, J., & Fragar, L. (Accepted for publication 2009). In Australia, can a user know whether a pesticide is a Hazardous Substance? Australia and New Zealand Journal of Occupational Health and Safety .

COLLABORATIVE PARTNERSHIP FOR FARMING & FISHING HEALTH & SAFETY

RIRDC Publication No. 09/116

The Collaborative Partnership for Farming and Fishing Health and Safety Completed Projects in 2008– 2009 and Research in Progress at June 2009, contains short summaries of continuing projects as well as those that were completed during 2008 – 2009. This program aims to improve the:

- mental health of farming and fishing families
- safety environment and work practices in farming and fishing industries
- physical health of farming and fishing workers and their families.

The Rural Industries Research and Development Corporation (RIRDC) manages and funds priority research and translates results into practical outcomes for industry.

Our business is about developing a more profitable, dynamic and sustainable rural sector. Most of the information we produce can be downloaded for free or purchased from our website: www.rirdc.gov.au, or by phoning 1300 634 313 (local call charge applies).

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RIRDC Innovation for rural Australia

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Rural Industries Research and Development Corporation

RURAL INDUSTRIES
Research & Development Corporation

RIRDC Completed Projects in 2011–12
and Research in Progress at June 2012

Primary Industries Health and Safety

SEPTEMBER 2012

RIRDC Publication No. 12/084

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Foreword

RIRDC produces summaries of completed and continuing projects for each financial year. Our intention is to:

- provide stakeholders with early access to the results of ongoing and completed work to inform their decisions, and
- inform researchers of results to shape research direction.

The Primary Industries Health and Safety Program *RIRDC Completed Projects 2011–12 and Research in Progress at June 2012* contains short summaries of projects funded by the Program. The Program aims to improve:

- the mental health of farming and fishing families
- the safety environment and work practices in farming and fishing industries
- the physical health of farming and fishing workers and their families

The current five year plan for the Primary Industries Health and Safety Program expired on 30 June 2012. A new five year plan is currently being prepared to re-establish the collaborative partnership.

This report is an addition to RIRDC's diverse range of over 2000 research publications most of which are available for viewing, free downloading or purchasing online at www.rirdc.gov.au. Purchases can also be made by phoning 1300 634 313.

Craig Burns
Managing Director
Rural Industries Research and Development Corporation

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Completed Projects – To improve the mental health of farming and fishing families

PRJ-004736 Capacity building of rural & remote communities to manage their mental health

Start Date:	04/06/2010
Finish Date:	25/01/2012
Researcher:	Delwar Hossain
Organisation:	University of Southern Queensland
Email:	Delwar.Hossain@usq.edu.au
Objectives	To build the capacity of climate affected rural and remote farming and associated communities to manage their mental health.
Background	Australia's rural communities exposed to climate-related extreme weather events or disasters experience social, physical and material conditions that adversely affect mental health. Post-traumatic stress disorder, depression and anxiety may all result. Due to increasing numbers of extreme weather events, the impact of natural disasters on mental health is a growing concern. Studies have found that mental health issues remain for a considerable time after the event and that, while post-disaster morbidity is likely to decline over time, the effects of exposure to the initial disaster and losses are likely to persist. Other mental health problems occurring in a post-disaster environment include depression, anxiety disorders, substance abuse and adjustment disorders. Landholders in particular undergo severe mental stress due to financial hardship from increased debt, making it difficult to plan for crops, stocking, improvements, breeding and succession. In turn this affects local businesses, limiting their ability to expand and employ staff. It also affects family relationships leading to more stress, worry and an increased rate of suicide. This project has been designed to build community capacity and more effectively manage their mental health. In particular, this project will increase collaboration and cooperation between farming people and organisations from various sectors in rural communities. It will enhance community capacity through participatory planning and evaluation methods to assist in the long term sustainability of community initiatives to manage their mental health by empowering communities, and increasing community involvement, ownership, participation and inclusion.
Research	A series of workshops were conducted in 12 selected communities in rural and remote Southern Queensland. Findings indicate that the rural people and their surrounding communities are under sustained stress resulting from a mix of droughts, floods, mining, vegetation and water policy. All were seen to impact on mental health and community well-being. A wide range of services and initiatives from government, non-government and the community have been identified during the workshops. A community initiative of note was the Tie up the Black Dog program which held events throughout the region and using sports and media personalities to entice men to attend activities. Despite existing resources, gaps and needs remain, and need to be addressed if capacity is to be built and maintained to manage mental health problems. A number of activities such as networking and collaboration between agencies and groups concerned with mental health issues, and collating information about, and promoting services and pathways to residents to improve access are proposed. There was a high level of interest in obtaining knowledge and skills in Mental Health First Aid – with suggestions that providing such skills across the community could strengthen capacity to recognise and address issues as they emerge. There was also a belief that such awareness and training could be better incorporated into other activities being run within the communities. For example, at an agronomy workshop, or in conjunction with Chamber of Commerce activities. The key would be to have materials readily available that could be adapted and used in

	these contexts and to have trainers with sufficient knowledge to effectively address the issues as well as any technical concerns.
Outcomes	- Clear understanding of the mental health issues of the communities in relation to climate variability - Understanding the appropriate measures to manage the mental health of the rural and remote communities - Community interest to work within the framework of community involvement - Consultation with key members of the communities to build the pathways to strengthening their capacity to address mental health problems has been initiated.
Implications	The project has highlighted the value of establishing networks and building relationships within the community. Such networking and relationships enhance the sharing of ideas, beliefs, and understanding of the issues. It brings cooperative attitudes, collaboration, and motivation to the fore. These actions empower rural and remote communities to come together and assist each other to manage the impact of stressors on that community and will assist in developing resilience among the members. A key issue then is how to best mobilise and support these networks. Having a framework of suggested processes, case studies and resources is one way that such cooperative action could be facilitated. The other important element was that each community is unique – and a framework and associated pathways needed to be robust enough to adapt to the individual situation. For this reason, a Participatory Action Research (PAR) approach is the most appropriate way to develop the framework, map out pathways and build capacity of the rural and remote communities during the process. The capacity building initiative depends on collaboration with and ownership by the community and this approach will assist the community to be able to effectively manage their mental health. Using frameworks developed through this process and the associated case studies will assist other communities to act and modify the process according to their own unique context.

Completed Projects - To improve the physical health of farming and fishing workers and their families

PRJ-003524 Staying healthy: Behaviours and services used by farmers and fishers

Start Date:	19/09/2008
Finish Date:	13/07/2012
Researcher:	Sue Kilpatrick
Organisation:	Deakin University
Email:	sue.kilpatrick@deakin.edu.au
Objectives	To investigate the process by which farmers and fishers achieve and maintain good physical and mental health in 'difficult times'.
Background	In recent years there has been an accumulation of factors which are having a particularly severe impact upon rural Australia. Collectively these factors are described as 'difficult times', and include the global financial crisis, climate change and the effects of long-term drought, and associated problems. 'Difficult times' impact on physical health and psychological wellbeing. Little is known about preventive behaviours in these circumstances.
Research	Five small rural sites were selected for inclusion in the study, representing five different rural industry areas: cane, cotton, fishing, grains and mixed farming. Sites had populations ranging from 1000 to 5000 people and represented diversity in terms of size, location, and level of remoteness. There were three data sources: in-depth interviews with farmers and fishers (N=110); participant journals (N=54), and mapping of health information, services and resources.
Outcomes	The study group demonstrated a high level of awareness of the link between physical and mental health and identified a range of strategies to achieve and maintain good physical health and mental wellbeing. Gender, age, industry area and nature of the community provided challenges and opportunities associated with maintaining good health, and impacted on patterns of farmer and fisher health service usage. Health behaviours were influenced by the way in which health was defined, and by individual health beliefs and philosophies. GPs were the most frequently accessed health service and the preferred source for health information. Community and industry play important roles in farmer and fisher health and wellbeing.
Implications	Governments, health services, industry organisations and local community and industry groups should be alert for the impact of 'difficult times' such as drought, flood, economic pressures and industry regulation on farmers and fishers and have a 'toolbox' of community appropriate solutions ready to implement. A clear implication of the study is the need for a collaborative approach to the issues of farmer and fisher health and wellbeing.
Publications	Peek, K., Johns, S., Kilpatrick, S. and Willis, K. (2011) Staying Healthy: How farmers and fishers maintain good health in difficult times, National Rural Health Conference, Cairns, Perth 13-16 March. http://nrha.org.au/11nrhc/papers/11th%20NRHC%20Peek_Karla_E5.pdf Willis, K., Johns, S. Kilpatrick, S. and Peek, K. (2011) Staying healthy: The case of cotton and cane growers in Australia, in Q. Le (Ed.), Health and wellbeing: A social and cultural perspective, Nova Science Publishers, pp. 117-126.

Completed Projects - To improve the physical health of farming and fishing workers and their families

PRJ-005434 Evaluation and development of Farm Health and Safety Toolkit for Rural GPs

Start Date:	30/05/2010
Finish Date:	30/03/2012
Researcher:	David Perkins
Organisation:	The University of Sydney
Email:	dperkins@gwahs.health.nsw.gov.au
Objectives	To increase knowledge and skills of rural medical practitioners and primary health care service workers in providing health services to their farmer and farm worker clients, by working with rural Divisions of General Practice, rural General Practitioner Registrar Education and Training organisations and rural health service providers.
Background	Australian farmers have higher rates of death from certain cancers, and higher incidence of cardiovascular disease, suicide and avoidable injury than other Australians, but poorer access to health services due to the shortage of medical specialists in rural communities. Rural General Practitioners are vitally important providers of a range of health services in their communities. Research evidence suggests that health promotion programs based in general practices can be effective, but more and better evaluations are needed to increase confidence in these programs. The Farm Health and Safety Toolkit for Rural General Practices (the Toolkit) was developed by the Australian Centre for Agricultural Health and Safety (University of Sydney) at Moree to provide rural clinicians with a practical resource based on the best available evidence to help them recognise and respond to the health risks faced by farmers and farm workers.
Research	Experienced presenters who were experts in farm health and safety issues presented the Toolkit to rural health professionals at short workshops held by Divisions of General Practice, Regional Training Providers and the Royal Flying Doctor Service. Short surveys were used to collect information at baseline and three to six weeks later. The surveys focussed on existing knowledge, key learnings and changes to clinical practice following the workshop. Health professionals involved in educating or supporting rural health professionals were asked to review the Toolkit interviewed to assess its content, style and ease of use, whether it contained any information gaps, how best to distribute it.
Outcomes	The evaluation found that the Toolkit is relevant, easy to use and fills an important gap in educational material available for rural health professionals. It should be made available in a number of formats, and in particular as electronic documents which can be emailed to practices and easily uploaded into practice management software. The evaluation confirms the need for a planned approach to distributing the Toolkit materials and suggests that it be incorporated into rural practice at undergraduate, postgraduate and post experience education.
Implications	Farmers organisations and rural stakeholders: Awareness and use of the Toolkit resources can make a valuable contribution to the health of the rural farming community by addressing health and safety risks, by acting to prevent illness and injury and by treating illness and injury early. The Toolkit could be promoted on appropriate ABC television and radio programs such as Countrywide, Landline and morning talk shows. Rural healthcare providers: The Toolkit should be incorporated into the practice support systems in those general practices and services which care for patients from farming communities. GPs should consider how the Toolkit can inform health checks, disease prevention and care for patients from the farming community. Providers of undergraduate, postgraduate and post experience education and

	training for rural health providers: The material in the Toolkit should be incorporated into the curricula of providers of undergraduate, postgraduate and continuing health education to students and rural health practitioners. Policy makers: Policy makers should consider whether the evidence in the Toolkit should be part of official guidance for GPs who care for members of the farming community such as 45 plus and 75 plus health checks. Consideration should be given as to how the Toolkit can incorporate new evidence about the health and safety risks faced by farmers and those who live on farms as it becomes available. RIRDC should consider how the Toolkit may be promoted so that the evidence is contains is available to the rural farming and healthcare community. Toolkit developers: Developers should seek endorsement for the Toolkit from relevant and authoritative organisations such as the Royal Australian College of General Practitioners, The Australian College of Rural and Remote Medicine, and appropriate farming organisations.
Publications	Boreland et al. Evaluation and development of Farm Health ad safety Toolkit for rural General Practices. (In preparation, for submission to an appropriate primary health journal)

Completed Projects - To improve the safety environment and work practices in farming and fishing industries

PRJ-004817 Drug and Alcohol use by farming and fishing workers

Start Date:	05/07/2010
Finish Date:	15/07/2012
Researcher:	Julaine Allan
Organisation:	The Lyndon Community
Email:	jallan@lyndoncommunity.org.au
Objectives	To describe the level of drug and alcohol risk among workers in the fishing and farming industries and identify strategies to reduce this risk and improve workplace safety.
Background	Farming and fishing workers operate in dangerous workplaces and workplace deaths and accidents of these workers have been well documented. Previous research has clearly indicated the hazardous nature of fishing and farming, and explored some of the industry pressures on fishers and farmers. Furthermore, some empirical and anecdotal evidence suggests certain fishing and farming workers may use drugs and alcohol excessively. However, at the present time, the lack of research about drug and alcohol use in the rural sector means that there is no clear understanding of how substances are used and which interventions may be most appropriate for rural, regional and remote communities in Australia, including farming and coastal communities.
Research	This study collected qualitative and quantitative data to describe farm and fishing workers' use of drugs and alcohol, their understanding of drug and alcohol related harms and the influence of workplace culture on drug and alcohol use. The research was conducted by a team from The Lyndon Community, Monash University, The University of Queensland and Charles Sturt University. It was funded by the Collaborative Partnership for Farming and Fishing Health and Safety from the Rural Industries Research and Development Corporation. Research sites in NSW and Victoria, Australia with either farming or fishing as the key industry were identified for the study via consultation with primary industry leaders. Study participants included key informants, farm and fishing employees and partners of workers. One hundred and forty five farm and fishing workers/contractors, partners of workers (n=99) and community leaders (n=46) across six research sites completed interviews and surveys between November 2010 and May 2011. The age range of participants was 18 to 75 years with an average of 41 years.
Outcomes	Alcohol is used at moderate to high risk or dependent levels by around 44% of study participants. This is considerably higher than in the general Australian population where 16% of rural dwellers are moderate to high risk drinkers (ABS 2006). There is limited awareness of how much alcohol people are consuming and what the long term health implications are. Illicit drugs were used by some people in the industry. Cannabis was the most common (12.7%) followed by amphetamines (8.5%). 20% of participants reported working under the influence of illicit drugs during the past 12 months. Tobacco was used by 36% of study participants and was the drug that caused participants most concern. Many employers are unaware of their legal responsibilities and rights in relation to alcohol affected employees who have accidents. Frequently this situation is complicated by the use of family members and friends who are unpaid. Most participants described substance use problems as the individual's responsibility and that they had to help themselves. There was limited awareness of the way community support for heavy drinking encourages high risk alcohol consumption. Employees are unlikely to seek healthcare, when they do their conditions are usually serious. Access to substance use and mental health

	services is limited and inconsistent. Help for problematic substance use is made more inaccessible because problems are minimised, hidden or ignored. Some employers ignored drug and alcohol use by employees because of labour shortages particularly during the harvest season.
Implications	Problematic substance use, especially alcohol, goes to the heart of industry productivity even though most people do not connect out of work substance use with workplace health and safety. Drug and alcohol interventions such as screening and workplace policies, are effective when accessible to the population. However, employers are not using existing policies and are reluctant to address drug and alcohol use in the rural industries workforce. Challenges include making interventions fit with the industry context and work practices. Employers may need advice and support to address substance use, particularly alcohol, directly with employees and to develop work place practices that discourage alcohol use. Farm and fishing workers need ready access to information and support to reduce harmful alcohol and tobacco use. A trial of a nationa on-line intervention for risky alcohol use is proposed as the most effective and acceptable intervention.
Publications	Allan, J., Clifford, A., Ball, P. Alston, M. Meister, P. (in press accepted). 'You're less complete if you haven't got a can in your hand': Alcohol consumption and related-harms in rural Australia: the role and influence of cultural capital. Alcohol and alcoholism Allan, J., Dowling, J., Clifford, A., Alston, M., Ball, P. (2011). Alcohol and drug use amongst fishing and farming workers: preliminary indications, perceptions and implications. Rural and remote Australia: The heart of a healthy nation. 11th National Rural Health Conference, Perth, 13-16 March 2011. Available from http://nrha.org.au/11nrhc/papers/11th%20NRHC%20Allan_Julaine_C7.pdf Allan, J., Clifford, A., Alston, M., Ball, P. (2011). Do people tell the truth about their substance use? A comparison of farm and fishing workers' interview and survey responses. Drug and Alcohol Review, 30 (supplement- abstract only):2

Research in Progress – Improve the competitiveness and sustainability of Australian agriculture

PRJ-005775 Cross contamination by chemicals of farming family members

Start Date:	30/07/2009
Finish Date:	30/07/2013
Researcher:	Nicole Curtis
Organisation:	South East Premium Wheat Growers' Association
Email:	david.bush@csiro.au
Objectives	To determine if farmers have chemicals in their bodies. To determine if non spraying family members have chemicals in their bodies. To determine if there is a correlation between the amount of chemicals in each person within a farming family/business.
Current Progress	A literature review has been conducted and statistical analysis of illnesses such as cancers and cases of child asthma compared to the general population. The literature review also includes identification of the long term effects caused by broadacre chemicals used in the Esperance Port Zone and the accumulation or break down of the different types of chemicals. Urine samples have been taken and sent off for analysis. Seventeen samples were processed in January in Victoria. This is the first lot of samples. The second lot of samples were taken in Autumn 2012. Families were contacted about this in February 2012. A report has been completed. This report interviews families who have participated in the 2011 project. A number of participants neglected to collect samples. This was possibly due to the difficult start to the growing season for farmers in the Esperance Port Zone. The families that did participate this year will be re-tested next year. A further 10 or more families will participate in 2012. It has been very difficult to source a laboratory to test the samples. Participants will be more closely monitored during collection of the samples in 2012 to ensure they are done properly.

RIRDC Completed Projects in 2011–12 and Research in Progress at June 2012

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RIRDC is a partnership between government and industry to invest in R&D for more productive and sustainable rural industries. We invest in new and emerging rural industries, a suite of established rural industries and national rural issues.

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Economic Evaluation of Investment in the Farming & Fishing Health & Safety R&D Program

RIRDC Publication No. 11/170

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Economic Evaluation of Investment in the Farming& Fishing Health & SafetyR&D Program

by Peter Chudleigh, Sarah Simpson and Jessica Lai

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or phone 1300 634 313

Foreword

The Farming& Fishing Health & Safety program aims to undertake R&D and research application activities that improve the:

- Physical health of farming and fishing workers and their families,
- Mental health of farming and fishing families, and
- The safety of the work environment and practices in farming and fishing industries.

The Program is funded by RIRDC, the Australian Government Department of Health and Ageing, Grains Research and Development Corporation, Fisheries Research and Development Corporation, Sugar Research and Development Corporation and Cotton Research and Development Corporation.

In May 2008 an Evaluation Framework for RIRDC was finalised. This framework, among other things, sets out a process for reviewing each of RIRDC's programs in the final year of its five year plan. One of the three programs selected for assessment in 2011 was the Farming& Fishing Health & Safety Program. A part of each specific program review is to select randomly three independent investments within the program for an impact evaluation through cost benefit analysis.The three economic analyses provide specific case studies that will demonstrate the extent and distribution of benefits that have been, are being, or will be, captured in future. Such information is valuable to not only RIRDC management, but also to the members of the industry (or industries) at which the investment has been targeted.

Another purpose of the economic analyses is tocontribute to a process being undertaken for the Council of Rural Research & Development Corporationsthat aims todemonstrate through examples the outcomes and benefits that have emerged or are likely to emerge from the 15 Rural Research and Development Corporations (RDCs). Valuation of these benefits, along with identification of investment expenditure, is required in order to demonstrate the RDCs' contribution to Australian rural industry as well as environmental and social benefits to Australia.

The projects evaluated demonstrated predominantly economic and social benefits, a number of which were quantified in value terms. Funding for the three groups of projects analysed totalled $0.92 million (present value terms) and produced aggregate total benefits of $3.92 million (present value terms). The analyses found all three investments provided positive returns with benefit-cost ratios ranging from 2.2 to 5.6.

The impact assessments serve the main purpose of providing accountability to government and industry/community stakeholders that research funds have been managed appropriately and are producing positive impacts and benefits to Australia.

This project was funded by the Collaborative Partnership for Farming and Fishing Health and Safety. This report, an addition to RIRDC's diverse range of over 2000 research publications, forms part of our Collaborative Partnership for Farming and Fishing Health and Safety Research and Development Program, which aims to improve the physical and mental health of farming and fishing workers and their families, and the safety environment and work practices in farming and fishing industries.

Most of RIRDC's publications are available for viewing, free downloading or purchasing online at www.rirdc.gov.au. Purchases can also be made by phoning 1300 634 313.

Craig Burns
Managing Director
Rural Industries Research and Development Corporation

Contents

Executive Summary

What the report is about

This report presents the results of economic analyses of three investments within the Farming& Fishing Health & Safety Program.

Who is the report targeted at?

The information contained in the report is targeted at Program and RIRDC management, those within the industries that support the Program, and the wider community. Another target audience is the Australian Government and Council of Rural Research and Development Corporations(CRRDC).

Background

In May 2008, an Evaluation Framework for RIRDC was finalised. This framework, among other things, sets out a process for reviewing each of RIRDC's programs in the final year of its five year plan. In the year ending June 2011, three RIRDC programs have been evaluated, and this report addresses the economic evaluation component for the Farming& Fishing Health & SafetyProgram.

The Framework contains two major components, a performance review and an impact assessment. This report is the impact assessment and addresses the economic evaluation requirement under the Framework. This report also addresses the reporting requirements for RIRDC under the joint initiative of the CRRDC.

Aims/objectives

The primary purpose of the report is to demonstrate that benefits have accrued from specific investments. Another purpose of the economic analyses is to contribute to a process being undertaken by the CRRDC that aims to demonstrate through examples the outcomes and benefits that have emerged or are likely to emerge from the 15 Rural Research and Development Corporations. Valuation of these benefits, along with identification of investment expenditure, is required in order to demonstrate the RDCs contribution to Australian rural industry as well as environmental and social benefits to Australia. The Australian Government is particularly interested in such contributions in order to be assured that public funding of R&D is being used to produce public benefits.

Beneficiaries

The beneficiaries of the report will be RIRDC management, the Australian Government, the CRRDC, the wider Australian community, and those industries specifically benefitting from the research analysed.

Methods used

The methods used in the economic analyses followed the instructions in the RIRDC Evaluation Framework, both in terms of project selection and in terms of the analysis process and reporting. The selection process satisfied the random selection process of the CRRDC as well as the evaluation requirements of RIRDC. This entailed the definition of the population of projects in the program, a random sampling process and a filtering process.

Each investment was evaluated by assembling information from the three projects or projectgroups from original project proposals, final reports, and any progress reports or other relevant publications. Assistancewas rendered by Program personnel, project principal investigators, industry personnel and others. The potential benefits from each investment were identified and described in a triple bottom line context. Some of these benefits were then valued.

The Present Value of Benefits (PVB) and Present Value of Costs (PVC) were used to estimate investment criteria of Net Present Value and Benefit-Cost Ratio at a discount rate of 5%. The Internal Rate of Return was also estimated from the annual net cash flows. The PVB and PVC are the sums of the discounted streams of benefits and costs. All dollar costs and benefits were expressed in 2010/11 dollar terms and discounted to the first year of the investment being analysed. A 40 year time frame was used in all analyses, with the first year being the initial year of investment in the R&D project. Costs for the R&D project included the cash contributions of the Program (includes both RIRDC and industry investment), as well as any other resources contributed by third parties (e.g. researchers or additional industry funds).

Analyses were undertaken for total benefits that included future expected benefits. A degree of conservatism was used when finalising assumptions. Sensitivity analyses were undertaken in most cases for those variables where there was greatest uncertainty or for those that were thought to be key drivers of the investment criteria.

Results/key findings

There was a range of expected economic and social benefits identified in the projects, and a number of these benefits were valued. Funding for the three projects/project groups analysed totalled $0.92 million (present value terms) and produced aggregate total expected benefits of $3.92 million (present value terms). The Programshare of the total investment was 62%. The analyses found all three investments provided positive returns with individual benefit-cost ratios ranging from 2.2 to 5.6.

As only 3projects out of apopulation of 17projects were analysed, these results cannot be used to infer anything about the likely range of results for the population of projects as a whole.

Implications for relevant stakeholders

The positive results in terms of both the number and range of benefits identified and valued demonstrate that the Program is delivering significant impacts and is providing a healthy return on investment. The overall result should be heartening for RIRDC, the industry, and policy personnel responsible for allocation of public funds.

Recommendations

There were no recommendations made.

1. Introduction

In May 2008, an Evaluation Framework for RIRDC was finalised. This framework, among other things, sets out a process for reviewing each of RIRDC's programs in the final year of its five year plan.

These reviews are aimed at serving two broad purposes:

- providing accountability to government and industry/community stakeholders that research funds have been managed appropriately and are producing positive impacts and benefits to Australia
- identifying research areas and processes that may prove fruitful in terms of future investment and ongoing program management

More specific purposes are:

- reporting against the program's five year plan
- identifying lessons learnt from past investment
- reporting to the Council of Rural Research & Development Corporations (CRRDC) on impacts as part of the overall reporting framework of the Research and Development Corporations (RDCs)

In broad terms, the Evaluation Framework encompasses a cohesive framework for evaluating research investment at project, program and portfolio levels for both accountability and future investment planning purposes.

The Framework contains two major components, a performance review and an impact assessment. The scope of this report is the impact assessment (or economic evaluation) requirements under the Framework, and the reporting requirements for the CRRDC.

In the year ending June 2011, three RIRDC programs have been evaluated, and this report is the economic evaluation component forthe Farming& Fishing Health & Safety Program.

The impact assessments provide specific case studies that will demonstrate examples of the extent and distribution of benefits that have been, are being, or will be, captured in future. Such information is valuable to not only RIRDC management, but also to the members of the industry (or industries) at which the investment has been targeted.

Section 2 of this report describes the methods used to select the projects for analysis, and how the analyses were undertaken. Section 3 summarises the results of the analyses, and Section 4 presents some findings and conclusions. Details of the three individual analyses are presented in Appendices 1 to 3.

2. Methods

2.1 Project Selection

The RIRDC Evaluation Framework has clear instructions for how projects to be economically evaluated should be selected. The guidelines for project selection were adapted following the completion of the 2009 economic evaluations, and the following are the revised guidelines for project selection.

The selection of projects for impact assessment must be random to satisfy the requirements for the CRRDC. However, as it is important for successful projects to also be chosen the approach to random selection is as follows:

1. *Assuming the Five Year Plan (FYP) has been completed; list all projects that have been completed in the period of the FYP, and also include those that were/are due for completion up to six months after the completion of the FYP. If the FYP has not yet been completed, then all projects that have been completed at the time of the analysis should be included, as well as projects that have had a significant milestone and accomplishment, or are very close to completion.*
2. *Delete postgraduate scholarships, travel grants, general communications and reviews (special extension and some reviews with impact could be retained), conference support, program support and special events.*
3. *Delete projects of low value. The appropriate minimum value of projects to be included in the population will vary by program. This can be determined by the percentage of the total value of the population that is being excluded by setting the minimum value. One method is to list all the projects in descending value, determine the total value, and then determine how many projects at the bottom of the list make up say 2.5% to 5% of the total funding in aggregate. This rule of say 5% of total value could be applied across all programs, which would result in a different minimum value for each program.*
4. *The individual projects in the population should be stratified by program goals. Each project should be allocated to addressing a specific goal, and the total program funds invested in the projects addressing each goal should be summed. Then, if say, 80% of program funds are directed at Goal 1, the stratified sampling process can ensure that two projects from Goal 1 are selected for analysis.*
5. *All projects in the population should be assigned a random number using the random number generator in Windows Excel. The projects are then placed in order from highest random number to lowest and each project is considered in turn until an appropriate sample of three projects is identified. The factors for considering appropriateness are described in points (7) to (8) below.*
6. *In consultation with the Advisory Committee and Program Manager the analyst will discuss the impact of the selected project and the availability of information for undertaking an impact assessment. The assessment should consider not only the individual project selected, but also the project group as a whole if the selected project can be identified as forming part of a set of projects that collectively have contributed to an output or outcome. These can include projects completed prior to the current FYP, or outside of the population. Projects that together contributed to achieving an outcome are assessed as a set to avoid attributing the outcome to only a sub-set of the projects. Following the grouping, this assessment should classify each set as:*
    a. *too early: the projects have follow-on R&D that has yet to come to fruition*
    b. *low: there is little or no indication of outputs being adopted or likely to be adopted, or the project(s) failed to deliver the outputs expected, or other output that was serendipitous*
    c. *medium: there is evidence of adoption but uncertainty about how big the benefits are*

d. high: there is evidence of adoption and conviction that the benefits have been high and/or good spillovers have been identified.
e. difficult to quantify: the project is highly strategic in nature or has some other benefit that is very difficult to value in a quantitative way.

7. The previous step should be repeated until there is at least one 'high' project in the full sample, and arethree that meet the medium or high level.

Other factors to consider before finalising the sample are that the projects selected are representative of the program goals (as determined by the stratification earlier) and that the individual projects selected are not from the same project grouping (as defined earlier). Projects not meeting the stratification requirements should be excluded and new projects selected and rated in turn until all conditions have been met.

The first step involved defining the population of projects that were completed, or due to be complete,over the six years from July 2006 to June 2012 as defined in the RIRDC Clarity project database. The population therefore included projects starting earlier than this time period, and some projects that were not yet complete. Projects involving travel grants, general communications and reviews, conference support, program planning and support and special events were excluded in order to ensure that the population only included mainstream R&D projects.

The projects were arranged in descending order by value and the bottom 5% in value terms of projects were identified. This bottom 5% of projects were then excluded, which meant that projects with a value less than $35,000 of program investment were excluded from the population. This was to ensure that very small projects were not selected, and therefore ensure that a higher percentage invalue terms of the population was analysed.

This resulted in the exclusion of 14 projects, and a final population of 17 projects, with a total value of $2.45 million (nominal terms).A decision was made by the Program Manager that it was not necessary to stratify the population of projects by goal.

RIRDC confirmed that they were happy with the population definition andAgtrans assigned a random number between 0 and 1 to each of the 17 projects using the Excel random number generator. The three projects with the highest random numbers were then identified as the initial sample and sent to the Program Manager for rating as either too early, high, medium, low, or too hard to quantify as per the RIRDC evaluation guidelines.

The rating definitions were:

a. too early: the projects have follow-on R&D that has yet to come to fruition
b. low: there is little or no indication of outputs being adopted or likely to be adopted, or the project(s) failed to deliver the outputs expected, or other output that was serendipitous
c. medium: there is evidence of adoption but uncertainty about how big the benefits are
d. high: there is evidence of adoption and conviction that the benefits have been high and/or good spillovers have been identified.
e. difficult to quantify: the project is highly strategic in nature or has some other benefit that is very difficult to value in a quantitative way.

The three projects initially selected were:

- PRJ 004736Capacity building of rural and remote communities to manage their mental health
- PRJ 003083Sustainable Farm Families – Future Directions
- PRJ 000652Testing and delivering media communication strategies for child safety on farms

Project PRJ004736 was considered 'too early' as it was not yet finished, and the next project in line was selected:

- PRJ000541 Farm Safety Studies

All three projects (PRJ003083, PRJ000652 and PRJ000541) were ranked high impact (Table 2.1)

Table 2.1: Projects Randomly Selected for Analysis

No.	Project Codes and Titles	Cost (Program only, nominal $)	Rating
1	PRJ 003083Sustainable Farm Families – Future Directions	199,750	High
2	PRJ 000652Testing and delivering media communication strategies for child safety on farms	94,403	High
3	PRJ000541 Farm Safety Studies	240,686	High

The three selected investments making up the final sample analysed have a total nominal value of $0.53 million. The total value of the population (17 projects)was $2.45 million (nominal terms). Therefore, the sample of projects evaluated represent 18% in number and 22% of the population in value terms.

2.2 Individual Analyses

Each investment was evaluated through the following steps:

1. Information from the original project proposals, final reports, and any progress reports or other relevant reports and material was assembled with assistance from Program personnel, Principal Investigators and others.

2. An initial description of the project background, objectives, activities, costs, outputs, and outcomes and benefits was drafted. Additional information needs were identified.

3. For most projects, telephone contact was made with Principal Investigators and the draft sent to that person or persons for perusal and comment, together with specific information requests.

4. Further information was assembled where appropriate from industry personnel and others associated with the industry, and the quantitative analysis undertaken.

5. Drafts were passed by industry personnel for comment.

The potential benefits from each investment were identified and described in a triple bottom line context. Some of these benefits were then valued.

The factors that drive the investment criteria for R&D include:

C The cost of the R&D.

K The magnitude of the net benefit per unit of production affected; this net benefit per unit also takes into account the costs of implementation.

Q The quantity of production affected by the R&D, in turn a function of the size of the target audience or area, and the level of initial and maximum adoption ultimately expected, and level of adoption in the intervening years.

D The discount rate.

T_1 The time elapsed between the R&D investment and commencement of the accrual of benefits.

T_2 The time taken from first adoption to maximum adoption.

A An attribution factor can apply when the specific project or investment being considered is only one of several pieces of research or activity that have contributed to the outcome being valued.

P Probability of an R&D output, commercialisation etc. occurring. Can be applied when the research is not complete or when some further investment is required before the outputs of the research are translated into adoptable outcomes and extended to the industry.

Defining the 'without R&D' scenario to assist with defining and quantifying benefits is often one of the more difficult assumptions to make in investment analyses. The 'without' scenario (referred to here as counterfactual) usually lies somewhere between the status quo or business as usual case and the more extreme positions that the research would have happened anyway but at a later time; or the benefit would have been delivered anyway through another mechanism. The important issue is that the definition of the counterfactual scenario is made as consistently as possible between analyses.

The Present Value of Benefits (PVB) and Present Value of Costs (PVC)were used to estimate investment criteria of Net Present Value and Benefit-Cost Ratio at a discount rate of 5%. The Internal Rate of Return was also estimated from the annual net cash flows. The PVB and PVC are the sums of the discounted streams of benefits and costs. The discounting is used to allow for the time value of money. All dollar costs and benefits were expressed in 2010/11 dollar terms and discounted to the first year of the investment being analysed. A 40 year time frame was used in all analyses, with the first year being the initial year of investment in the R&D project. Costs for the R&D project included the cash contributions of the Program (RIRDC and industry investment), as well as any other resources contributed by third parties (e.g. researchers).

Analyses were undertaken for total benefits that included future expected benefits. A degree of conservatism was used when finalising assumptions. Sensitivity analyses were undertaken in most cases for those variables where there was greatest uncertainty or for those that were thought to be key drivers of the investment criteria.

Some identified benefits were not quantified mainly due to:

- A suspected, weak or uncertain relationship between the research investment and the identified R&D outcomes and associated benefits.
- The magnitude of the value of the benefit was thought to be only minor.

3. Results

The results for each of the three project evaluations are reported in Appendices 1 to 3. The following provides a summary of results of the three evaluations.

3.1 Qualitative Results

Table 3.1 identifies the benefits from each of the three case studies. Each benefit is categorised as economic, environmental or social. Not all of the case studies demonstrated benefits from each category. In fact there were no environmental benefits identified.

Table 3.1: Summary of Benefits for Three Investments

Project Cluster	Benefits
Sustainable Farm Families – Future Directions	Economic • Saved health costs for future additional participants and their families who will participate in SFF due to evidence provided by the Future Directions project • Saved long-term public health costs due to preventative health, wellbeing and safety measures taken by additional future participants who will participate in SFF due to evidence provided by Future Directions project • Saved health costs for participants in the Future Directions project due to reinforcement of messages from earlier SFF participation Environmental • Nil Social • Improved health, safety and wellbeing of future additional participants and their families who will participate in SFF due to evidence provided by Future Directions project • Improved health, safety and wellbeing of all future participants due to changes to the program influenced by the Future Directions project • Improved health, safety and wellbeing for participants in the Future Directions project due to reinforcement of messages from earlier SFF participation
Testing Media and Communication Strategies	Economic • Potentially more efficient use of industry media and communication resources regarding child farm safety • Potentially increased productivity on farms due to reduced worry and concern • Potentially reduced public health costs associated with child injury and death on farms • Potentially more efficient use of public media and communication resources regarding child farm safety Environmental • Nil

	Social • Potentially reduced risk of child injury and death on farms
Farm Safety Studies	Economic • Reduced healthcare costs due to reduced likelihood of death and injury on farms • Efficiencies in use of resources to develop and promote farm safety practices • Reduced loss of income and productivity to employees and employers from lost time due to injury and/or death Environmental • Nil Social • Reduced death and injury for those on farms

3.2 Quantitative Results

The investment criteria calculated for each project cluster were the Net Present Value (NPV), the Benefit-Cost Ratio (B/C Ratio) and the Internal Rate of Return (IRR). The NPV is the difference between the Present Value of Benefits (PVB) and the Present Value of Costs (PVC). Present values are the sum of discounted streams of benefits and/or costs. The B/C Ratio is the ratio of the PVB to the PVC. The IRR is the discount rate that would equate the PVB and the PVC, thus making the NPV zero and the B/C Ratio 1:1. Investment criteria were estimated for both the total investment and for the Program (RIRDC and industry)investment. For one of the projects total investment was the same as the Program investment.

Table 3.2 presents the investment criteria for the total investment in each of the three projectsanalysed at a 5% discount rate.

Table 3.2: Investment Criteria for Total Investment for Projects

(discount rate 5%)

Investment (Project)	PVB ($m)	PVC ($m)	NPV ($m)	B/C Ratio	IRR (%)
Sustainable Farm Families – Future Directions	1.39	0.25	1.14	5.59	21.5
Testing Media and Communication Strategies	0.24	0.11	0.13	2.21	12.0
Farm Safety Studies	2.29	0.56	1.73	4.07	23.9

Table 3.3 presents the investment criteria for the Program investment only in each of the three projectsat a 5% discount rate.

Table 3.3: Investment Criteria for ProgramInvestment Only for Projects

(discount rate 5%)

Investment (Project)	PVB ($m)	PVC ($m)	NPV ($m)	B/C Ratio	IRR (%)
Sustainable Farm Families – Future Directions	1.12	0.20	0.92	5.57	21.3
Testing Media and Communication Strategies (a)	0.24	0.11	0.13	2.21	12.0
Farm Safety Studies	1.08	0.26	0.82	4.09	24.1

(a) The Program Investment and Total Investment criteria are the same as there was no 'other' investment in this project cluster

Total funding for the three investments analysed was $0.92million (present value terms) and produced aggregate total expected benefits of $3.92 million (present value terms). The Programshare of the total investment was 62%. The analyses found all three investments provided positive returns with individual benefit-cost ratios ranging from 2.2to 5.6.

The results produced are highly dependent on the assumptions made in each analysis, many of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes.

A confidence rating based on these two factors has been given to the results of each investment analysis (Table 3.4). The rating categories used are High, Medium and Low, where:

High: denotes a good coverage of benefits or reasonable confidence in the assumptions made

Medium: denotes only a reasonable coverage of benefits or some significant uncertainties in assumptions made

Low: denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 3.4: Confidence in Analysis for Three Project Clusters

Project Cluster	Coverage of Benefits	Confidence in Assumptions
Sustainable Farm Families – Future Directions	Medium	Medium
Testing Media and Communication Strategies	Medium	Low
Farm Safety Studies	Medium	Low

3.3 Previous Economic Evaluations of Investments in Farm & Fishing Health & Safety Programs

An evaluation of the former Farm Health and Safety Joint Venture Research Programwas undertaken by Agtrans Research in 2008 (Chudleigh and Simpson, 2008). The study included benefit-cost analyses that quantified the return on investment of 3 of the projects. The projects were selected for evaluation on the basis of being anticipated to be high impact, as well as the relative availability of information on their likely impact. The results of the evaluations (discounted to 2005/06 at a 5% discount rate, over 30 years from the first year of investment, and expressed in 2005/06 dollar terms) are shown in Table 3.5.

Table 3.5: Investment Criteria for Three Selected Investments in the Farm Health and Safety Joint Venture Research Program

Project cluster	Present Value of Benefits ($m)	Present Value of Costs ($m)	Net Present Value	Benefit to Cost Ratio	Internal Rate of Return (%)
US-87A and GAP1A National Farm Machinery Safety Program and Regulatory Review	4.38	0.32	4.06	13.8	34.5
US-126A: Effective Safe Play Area Fencing Options for Rural Properties	1.62	0.03	1.59	55.5	178
US-86A and US121A: National Farm Injury Data Collection	1.65	0.55	0.98	2.5	14.8

The B/C Ratios range from 2.5:1 to 55.5:1. It is difficult to compare this result to those in the current analysis, as the projects analysed in Chudleigh and Simpson 2008 were selected as high performing, rather than being randomly selected.

A benefit cost analysis was carried out by Agtrans Research (2010) for the Fisheries R&D Corporation (FRDC) on a group of projects targeted at occupational health and safety in the fishing industry. There were three projects included in the analysis. The projects focused on infections in western rock lobster fisherman, the safety of pearl divers, and an OHS DVD for use in the post-harvest sector. Table 3.6 presents the results of the analysis. The analysis is in 2008/09 dollar terms and the present values were calculated using a discount rate of 5% (discounted to 2008/09). The analysis ran for 30 years from the last year of investment.

Table 3.5: Investment Criteria for a Workplace Safety Cluster Analysed for FRDC

Project cluster	Present Value of Benefits ($m)	Present Value of Costs ($m)	Net Present Value	Benefit to Cost Ratio	Internal Rate of Return (%)
FRDC Workplace safety cluster (3 projects)	5.12	0.75	4.37	6.8	27.8

4. Findings and Conclusions

4.1 Summary of Findings

A summary of findings for each of the three investments is provided below. The detailed impact assessments are included in appendices 1 to 3.

Sustainable Farm Families – Future Directions

The investment in this project has contributed to demonstrating the impact of the Sustainable Farm Families (SFF) approach to improving health and safety on farms. This will in turn contribute to continued funding of the program, and continued interest in the program by farming families. The benefits from the project have been estimated by valuing the improvements in health for those participants who would not have been a part of the future SFF program if the Future Directions project had not been undertaken. A small increase in health and wellbeing outcomes for all participants is also valued.

Given the assumptions made and a discount rate of 5%, the total investment of $0.25 million (present value of costs) was estimated to produce expected total benefits of $1.39 million (present value of benefits) giving a net present value of $1.14 million and a benefit-cost ratio of 5.6 to 1. The internal rate of return was 21.5%.

Testing Media and Communication Strategies

The project was successful in providing an evaluation of the performance of a range of communication and media tools used to promote messages regarding child safety on farms. There is the potential for the findings and recommendations from the evaluation to be used by those developing child safety media and communication materials to enhance the effectiveness of those materials, and therefore increase the adoption of child safety practices on farms. Such adoption could lead to a subsequent reduction in the probability of a child being fatally injured on a farm.

However, to date, there has been little usage of the projects outputs, largely due to a reduction in funding for child farm safety campaigns. In addition, time lags in data regarding deaths on farms and difficulties in determining any causal links between safety campaigns and subsequent reductions in death and injury rates led to difficulties in estimating the benefits from the research. Despite this, a probabilistic approach to valuing the potential benefits from the projects outputs was used in this analysis. Given the assumptions made, the results were that using a discount rate of 5%, the total investment of $0.11 million (present value of costs) would produce expected total benefits of $0.24 million (present value of benefits) giving a net present value of $0.13 million and a benefit-cost ratio of 2.2 to 1. The internal rate of return was 12%. This benefit-cost ratio is influenced by the low value of the investment and the high value of life of a child.

Farm Safety Studies

In order to improve understanding of the factors contributing to safe farm practices, more knowledge was needed on the perceptions of, and attitudes to, safety on farms by those who live and work on farm. In addition, knowledge was needed on how information about farm OHS is received and used on farms, what impediments and costs are associated with uptake and the practical benefits that accrue from increased attention to safety.Alongitudinal study was funded to engage with farmers and their families and workers to gather information about the nature and scale of the OHS problem on farms. The baseline for such a longitudinal study was funded through this project.

The project also funded activity to continue to collate and report a wide range of data on OHS practices and incidents on farms, as the National Farm Injury Data Centre has been doing for a number of years. The funding provided by the project analysed here allowed for such work to continue.

The investment in this project has resulted in a number of outputs including a baseline industry farm safety survey in NSW, and a series of 'chartbook' publications on high priority issues regarding health and safety in agriculture. These outputs have been, and will continue to be, used to influence a wide range of policy, research and communication applications, and there is some evidence of that use to date. As with a lot of research related to health and safety, it is difficult to determine with confidence a causal relationship between the outputs of this research, and any subsequent reduction in the likelihood of death or injury on farm. However, an attempt has been made here to place a value of on the potential impact of the research outputs.

The benefits of the research were valued assuming a contribution to a decreased probability of death on farms in the future. The analysis found that given the assumptions made, for the investment of $0.56 million (present value terms) there was a return of $2.3 million when considering benefits over 40 years (present value using a 5% discount rate). This resulted in a benefit-cost ratio of 4.1 to 1.

Public versus private benefits

All three project clusters have captured both public and private benefits. There will be private benefits to those living and working on farms in terms of avoided death and injury, and avoidance of associated health care costs and 'friction' costs that come with lost income and productivity as a result of the individual and workplace recovering from the injury or death. In addition, there may be benefits to industry generally through more efficient use of resources invested in improving farm health and safety. The public benefits will also be in the form of reduced health care costs and efficiencies in resources spent on farm health and safety improvements.

Distribution of benefits along the supply chain

For all three projects analysed, the benefits will largely accrue to the public and to individuals on farms. There are no supply chain costs or benefits. With respect to the Sustainable Farm Families project however there may be implications for the medical community in terms of increased visits in the short-term, but reduced needs for visits and medication in the longer-term.

Benefits to other primary industries

The benefits from all three research projects will potentially accrue to a wide range of agricultural industries, as all three projects have targeted a range of industries, and not been limited to one specific enterprise type. For example, The SFF program (including the Future Directions component) has had participants from a wide ranging number of agricultural industries including grazing, cropping and horticulture enterprises. None of the randomly selected projects focused on the fishing and forestry industries, and there is limited scope for these particular projects to have influence to members of those industries.

Match with national priorities

The Australian Government's National and Rural R&D Priorities are reproduced in Table 4.1.

Table 4.1: National and Rural R&D Research Priorities 2007-08

Australian Government	
National Research Priorities	**Rural Research Priorities**
1. An environmentally sustainable Australia 2. Promoting and maintaining good health 3. Frontier technologies for building and transforming Australian industries 4. Safeguarding Australia	1. Productivity and adding value 2. Supply chain and markets 3. Natural resource management 4. Climate variability and climate change 5. Biosecurity *Supporting the priorities:* 1. Innovation skills 2. Technology

All three projects will contribute to National Research Priority 2. None of the projects contribute directly to any of the Rural Research Priorities, as none of the Rural Research Priorities address health and safety on farms. However, for all three projects here may be some minor contribution to Rural Research Priority 1 through the avoidance of lost productivity on the farm that can occur as a result of the trauma of a death within the farm family.

Additionality

If the government's contribution to RIRDC was reduced by half, then it is likely that the three projects would have still been funded, as RIRDC is only one contributor to the FFHS program. It is likely that RIRDC would still take on the role of managing this program, as it is seen as a high priority cross-industry issue where efficiencies can be made by funding multi-industry projects through one program. The individual projects would still have been relatively high priority, but some of themmay have had reduced budgets if less funds were available.

If government funding of RIRDC did not exist at all, then the delivery of public benefits may have been restricted for all three investments. It is unclear whether public agencies other than RIRDC would have funded these types of investments (e.g. health research funders) or whether industry funds alone would have been directed to the investments.

4.2 Conclusions

The current analyses of three projects from the Farming and Fishing Health and Safety R&D Programhave shown benefit-cost ratios in the range of 2.2 to 5.6. The three projects analysed represent 22% of the population of projects in value terms.

The benefits identified were both economic and social benefitsresulting from improvements in the health and safety practices of Australian farmers, therefore reducing the likelihood of death or injury occurring on-farm. Subsequent benefits include reduced healthcare costs and reduced loss of productivity.

There are difficulties in estimating the benefits from health and safety research in a quantitative sense due to difficulties placing values on the loss of life, as well as difficulties making a causal link between policies and promotion strategies, changed practices on farm, and subsequent improvements to health and safety.

Despite these difficulties, the positive results in terms of the benefits identified and those valued demonstrate that the Program is delivering impacts and is providing a return on investment. The overall result should be heartening to RIRDC management, the industries funding the program, and policy personnel responsible for the allocation of public funds.

References

Agtrans Research 2010 An Economic Analysis of FRDC Investment in Workplace Health and Safety (Cluster 22) http://www.frdc.com.au/research/benefits/BCA13-Workplace-safety

Chudleigh, P. and Simpson, S. (2008) Farm Health and Safety Joint Research Venture Impact Evaluation. RIRDC Publication No. 08/141.

Appendix 1: Impact Assessment of Investment in Sustainable Farm Families – Future Directions

Background

The Sustainable Farm Families (SFF) program originally ran from 2003 to 2007 and was funded by the Joint Research Venture for Farm Health and Safety. It was developed by the Western District Health Service in Victoria and involved collaboration with health services, university, agricultural agencies training bodies and farming communities. It involved the participation of 128 farm men and women from three states over three years, as well as a separate cotton and sugar program which ran for two years in NSW and Qld involving 65 participants. The purpose of the program was to influence farmers' behaviour with respect to their health, safety and wellbeing. Participants were self-selecting, aged between 18 and 75 years, and had farmed for more than five years. Participants engaged with the project through annual workshops, newsletters and their industry association over the three years.

Over the life of this original program there were statistically significant reductions among participants of the clinical indicators that correlate to major diseases such as cardiovascular disease and type 2 diabetes (e.g. blood pressure, fasting blood cholesterol, body mass index, and waist measurement).

Due to its success the program had its funding extended through a variety of industries, philanthropic organisations and government, so that there by 2009 there had been over 1,700 participants engaged with SFF programs, and 135 rural professionals had undertaken SFF training. Some of the areas into which it was extended include dairy farmers in 11 locations across Victoria; remote farming populations in nine locations in WA, Qld, NT and NSW; Victorian farmers in 50 exceptional circumstances locations; and North Western Tasmanian farmers in one location.

A project was funded by the Fishing and Farming Health and Safety Program to revisit the original 193 participants to understand the longer term impacts of SFF five to six years after the commencement of the original SFF program. This project is called SFF – Future Directions and is the project evaluated here.

The Project

There is one project included in this analysis.Table 1 provides the Project Number, Project Title, Research Organisation, Principal Investigator and Period of Research for the project.

Table 1: Summary of Project Details

Project Number	Project Title	Other Details
PRJ003083	Sustainable Farm Families – Future Directions	Research Organisation: Deakin University Period: 30 May 2009 to 30 March 2011 Principal Investigator: Susan Brumby

Project Objectives

The objectives for project PRJ003083 are:

- To consider the long-term benefits (health gain, equity and empowerment) from the Sustainable Farm Families program on the individual, the farm and the family.
- To measure and evaluate if their clinical improvements have been maintained and to gather evidence about their morbidity and mortality.
- To evaluate the acquired skills, knowledge and change in behaviour associated with completing the first program.
- To communicate project findings to both participants and industry.

Project Costs

Details of the annual total investment in the project are provided in Table 2.

Table 2: Estimate of Investment in PRJ003083 (nominal $; including Program and other contributions)

Year ending June	2009	2010	2011	Total
Program	115,000	30,680	54,070	199,750
Other contributions[a]	0	42,600	5,000	47,600
Total	**115,000**	**73,280**	**59,070**	**247,350**

[a] The other contributions include in-kind contributions from Deakin University, Western District Health Service, La Trobe University, Cotton R&D Corporation and farmer participants

Project Description

The agricultural industries and locations involved in the longitudinal study were:

- Mixed grazing, wool production, cropping and beef production locations at Benalla, Hamilton, Swan Hill and Horsham in Victoria, and Clare in South Australia
- Cotton production at Wee Waa in New South Wales and Dalby in southern Queensland
- Sugar production at Ayr and Ingham in central Queensland

Data from each of the original 191 (out of a total of 192; one was now deceased) participants was obtained, and each of these original participants was then contacted personally by phone to invite them to participate in the extension of the SFF program. The participants were asked to fill out a number of questionnaires. The questionnaires used were the same as those that had been used when the participants were first involved in the program. The questionnaires related to:

- Health conditions
- Health behaviours
- Farm safety
- Health and wellbeing – Kessler K10 (a measure of non-specific psychological distress)
- Agri-chemicals usage

Workshops were held at the same ten locations as they had been in the original SFF program, and they were also held at the same time of year where possible. The workshops were held between 5 and 6 years after the initial workshops had been held. On the day of the workshop a number of medical tests were conducted using the same types of equipment and testing protocols that had been used to conduct the same tests during the original SFF program. The tests included:

- Cholesterol

- Blood glucose
- Systolic and diastolic blood pressures (measured by two methods)
- Height, weight, waist and hip circumferences
- Body mass index
- Body fat percentage

As well as the physical health assessments, the SFF Future Directions workshops involved:

- Focus group discussions moderated by social scientists, providing the opportunity for farm men and women to talk in groups about the various issues affecting the links between family health and farm productivity
- Pre and post knowledge assessments
- Action planning and reflection to address behaviour, lifestyle and business decisions
- Feedback to all participants of the results of the original SFF program
- Presentation of updated pertinent rural and agricultural health and safety topics

The areas of focus group discussion related mostly to changes since first participating in the program including:

- attitudes to health, wellbeing and safety
- health behaviours
- any significant family, career and farming business decisions as a result of participation in the program
- had a changing climate impacted on their health, wellbeing or farm business decisions
- had they used or referred to the SFF participant manual since the original program
- any other changes since participation in the program

The focus group discussions were scribed and later analysed. Following the focus groups, individuals gave short presentations on how the SFF program had influenced their farming family lives over the past five years. This included sharing the action plans they had developed during the original SFF program, and telling their story of how they had followed it. They were also asked to self rate their achievement against their plan.

There was also some additional information presented to workshop participants to update relevant health and safety information since the last workshop had been delivered, for example, there was a focus on respiratory health that had not been captured in previous workshops.

Following the completion of all of the workshops and data collection, an independent qualitative evaluation of the program was undertaken by a consulting firm (Roberts Evaluation). It involved semi-structured interviews conducted over the telephone with a randomly selected sample of 54 participants (stratified by gender, age, geographic location, and industry). Seven of those interviews were in-depth. In addition, six industry partners were interviewed. The industry partners included farmers groups such as the Victorian Farmers Federation (VFF) and Australian Women in Agriculture, as well as the Cotton R&D Corporation, the Sugar RD Corporation and the Grains R&D Corporation. This external evaluation focused on determining if the SFF program:

- Altered the way participants think about their physical and mental health and safety
- Influenced participants' health and safety decisions in their daily lives
- Impacted on participants' resilience and the way they deal with change
- Influenced the way that participants see their health in relation to their farm practices and productivity

Outputs

The major outputs from the project include:

- A report detailing the results and key findings of the project with respect to how the SFF Program has influenced the health, wellbeing and safety of participants. The report also includes recommendations with respect to improving the ongoing and future SFF programs that are operating throughout Australia.

- A number of communication activities were carried out including presentations at six Australian and international conferences; publication of six media articles; publication of newsletters for industry partners, two posters to assist in promoting the program, and a fridge magnet provided to all the participants who were invited to the workshops.

Examples of the key findings with respect to the influence of the program on the original 191 participants are listed below. It should be noted that the potential reasons for these changes, and other factors that may have contributed to these changes apart from SFF are not always indicated:

- There was a retention rate of 77% of participants from the 191 who participated in the first SFF workshops, to 148 who participated in the workshops as part of this project.

- The proportion of farm families reporting that their health was either excellent or very good had increased, but so had the number indicating their health was fair/poor. The number indicating their health was 'good' had declined.

- The number of alcohol consumers decreased from the first SFF workshop to the SFF Future Directions workshops. Overall alcohol consumption use diminished over the course of the research phase, however those consuming alcohol at the highest levels (measured as drinks per week) did increase over the research phase.

- As part of the original SFF program, participants had often been given referrals to appropriate agencies and services for further medical investigation of a number of issues (e.g. skin lesions, cardiovascular assessment). Ninety-four percent of participants in the SFF Future Directions workshops indicated they had acted upon the last referrals they had been given from the previous SFF program they attended.

- Over the whole group, total cholesterol levels decreased significantly, while blood glucose levels and body mass index both increased. For the participants who had been identified as at risk in the first program, there were significant improvements in the key areas of fasting cholesterol, and systolic and diastolic blood pressure.

- SFF participants have reduced their psychological distress levels, with many participants moving from the high-very high categories during the first workshop into the low-moderate categories in the SFF – Future Directions workshop. This reduction is likely to have been influenced by the program, but in some cases could also be partly explained by the higher level of climatic stress and hardship at the times of the original tests compared to the Future Direction Workshops.

- There was a significant increase in the total utilisation of personal protective equipment, including that required when using chemicals, when using outdoor tools, workshop tools and machinery (e.g. eye and ear protection) and equipment required for sun protection.

- Late in the previous SFF program, participants were asked if they wore a helmet while riding a motorbike, and if not, why they didn't. Based on the feedback from that program, the design of motorbike helmets has been changed to incorporate a more practical and comfortable design

for farmers. This new helmet was introduced to farmers as part of the SFF – Future Directions workshops.

- Participants were surveyed as to their knowledge with respect to health and wellbeing. The survey results showed that there had been an overall retention in learnings for both female and male participants from the original program to SFF Future Directions. Of the 19 questions analysed for females, 12 had significant increases in learnings retained, and 9 out of 16 questions asked of males had significant increases in learnings. There was only one question where knowledge had reduced, with all others having increased, although not significantly.

- During the first SFF program, participants were asked to develop action plans for particular health or safety target areas, and review and revise them every twelve months. At the end of the first program (24 months after their first workshop), 83% of participants rated their achievement of action plans with moderate to high results. In the SFF Future Directions workshop participants (60 to 72 months after their first workshops were held) were again asked to rate their achievement and this number had increased to 86% with a moderate to high rating.

- During the focus groups, 19% of participants stated they now have an increased awareness of the impact their choices have on their daily lives as a result of the program, and that 21.7% have opted for a healthier diet (reading labels and growing vegetables), while 20.3% have more regular check-ups.

- During the focus groups, 42.6% of participants indicated they had made a significant family, career or farming business decision as a result of participating in the SFF program.

- 20.9% of participants indicated they had changed their lifestyle (e.g. more recreation time and doing activities as a family); while 17.9% had made changes to make the farm a safer work place, and 16.5% had made positive changes with respect to exercise.

- Focus group participants were asked whether a changing climate has impacted their health and wellbeing, or the farm business decisions. Participants reported that the changing climate has increased stress levels for 19.3%, and that it had affected the decision making of 28.9%. This finding conflicts somewhat with the findings from the SFF Future Directions workshops that stress had decreased significantly

The independent evaluation of the program undertaken by Roberts Evaluation Pty Ltd, and reported in the final report for PRJ003083 made the following conclusions:

- Approximately 68% of respondents had altered their previous ‘she’ll be right’ attitude to one of preventative action, and are now going for regular checkups.

- The program has increased 97% of participant farmers’ knowledge of relevant health issues.

- Of respondents, 55% had improved their diet, 45% had increased exercise, 45% were taking time away from the farm and doing activities to de-stress, and 19% were seeking treatment for health issues, compared to when they commenced the program.

- The SFF program had increased participants’ resilience and the way they deal with change.

- It was recommended that the SFF model be continued and implemented to new groups of farmers, whilst maintaining further follow-up with current farmers to continue to monitor progress and reinforce messages.

Outcomes

The outputs of the research can be used to demonstrate to potential funders and participants that participation in the program is worthwhile, and that the benefits are ongoing and not short-lived. For example, there has recently been funding approved from the Victorian governmentto run the SFF program in 12 flood affected communities in Victoria. This funding decision would have been partly influenced by the Future Directions project, as the findings were being widely promoted in the media at that time. In addition, a decision to fund four pilot SFF programs in Queensland (Greenvale, Bollon, Wondai, Georgetown) while the Future Directions project was still being undertaken was also likely influenced by the activities of the Future Directions project in Queensland at that time. It is anticipated that in the future, the findings of the Future Directions project will continue to be used to demonstrate the long-term impact of the SFF program. It has also contributed to building the evidence base for clinical and health promotion practice and engaging with farmers.

In addition, the outputs of this research will be used to make improvements to the SFF program where required, to ensure that it continues to provide the maximum health, safety and wellbeing benefits to participants. For example, in future there will be an increased amount of one-on-one interaction that will be incorporated into the program, and the testing and delivery of information relating to diabetes will be moved to the first workshop rather than the last workshop. In addition, a decision was made to obtain a blood testing machine for use in the workshops that can undertake lipid analysis and therefore identify good versus bad cholesterol, rather than just total cholesterol (Susan Brumby, pers comm., 2011).

It is possible that the SFF Future Directions workshops held as part of this project might also have outcomes for the individual participants, with respect to reinforcing the messages from the program, and ensuring continued focus on the lessons learnt.

An evaluation survey was given to participants at the completion of the SFF Future Directions Workshop. Participants responded very positively to the quality of the presentations and their appreciation of the opportunity to learn more about health issues. The physical assessments and specific data on their own health were important factors in encouraging the farmers to continue their participation with the program, as well as to change their attitudes and actions.

The sense of empowerment to make improved health and lifestyle decisions provided by the SFF program was another positive attribute highlighted. This included the preventative aspect, and putting responsibility and influence over health back to the individual. The vast majority of respondents indicated that they ‘strongly agreed’ or ‘agreed’ that they could apply the content in the workshops to their life and work.

One hundred percent of respondents indicated that they would recommend the SFF program to other farm families, and a large number of them had already done so. The reasons they would recommend it included that it was practical and relevant, and the delivery method provided an environment where the participants felt safe and welcomed, and free to openly discuss issues.

Some research priorities were identified from lessons learnt as part of the Future Directions project, for example, information around hearing and working with a hearing deficit were requested from participants and the Western District Health Service is partnering with ANU and the National Acoustic Laboratory in a grant to address this.

Benefits

A specific benefit of the SFF Future Directions project relates to the influence the findings and recommendations will have on securing new and continuing investment in extending the program to new areas and new participants. It is likely that even without the Future Directions project that the SFF program would have continued to be funded in the future, however it is noted that the funding from year to year is insecure, and the continuation of the program relies on one-off grants.The evidence

provided in this project will likely lead to an increased security of funding and therefore an increase in the number of farm families participating each year. It will also lead to some improvements to the program that might lead to increased benefits from future programs (e.g. new information on respiratory health, improved blood testing equipment, change of timing of delivery of diabetes information).

The major potential benefits from the investment in the entire SFF investment (including the SFF Future Directions component) relate to improvements in the health and wellbeing of farm families. The ways in which the program improves the health and wellbeing of participants and their families includes:

- More attention to and improvements in farm safety.
- Participants are more likely than before to seek medical advice by going to a doctor.
- Participants are more likely to take preventative measures to improve their health and wellbeing (e.g. diet and exercise).
- Participants are more likely to better manage stress and work/life balance and therefore improve mental health.

Over time, this program has engaged over 1,700 participants and their families across all states and the Northern Territory, and across a wide range of agricultural industries.

An economic evaluation was carried out on the original program in 2006 (Boymal et al, 2006). The analysis focused on the improvements in quality of life, and the estimated downstream cost savings, through changes in morbidity and mortality relating to cardiovascular disease and type 2 diabetes, given changes in behaviour and clinical indicators. It did not include potential changes to morbidity and mortality as a result of improvements in farm safety, cancer risks, and anxiety and depression.

The 2006 study (Boymal et al, 2006) used the concept of quality adjusted life years (QALYs) to estimate the health benefits from the program. One QALY is said to be equal to one year of perfect health. The study found that for all participants, the mean change in estimated life years over 10 years was -0.22% in relation to cardiovascular indicators. The average change in probability of a cardiovascular disease event was -2.12%. This is likely to result in the avoidance of 2.06 cardiovascular events among 97 participants over 10 years (the data is based on 97 participants only as there were three years of data available for this number of participants at the time of the study). The reductions were higher when considering only those participants with baseline problems. When converted to QALYs, the QALY gained with respect to cardiovascular disease over 10 years per participant was 0.74 (undiscounted).

For Type 2 Diabetes, there was no change in the probability ofdeveloping the disease when considering all participants, however, when considering participants with a body mass index of greater than or equal to 25 (68% of participants), then the mean change in probability of Type 2 diabetes from the program was 12%, leading to avoidance of 8 cases of Type 2 diabetes. When converted to QALYs, the QALY gained with respect to Type 2 Diabetes was 4.72 (undiscounted) over 10 years.

Together, the QALY gained as a result of the reduction in cardiovascular disease and Type 2 diabetes, is 5.61 over 10 years (undiscounted) across the 97 participants for whom three years of data was available at the time of the study (which equates to approximately 0.058 QALYs per participant).

In considering these potential benefits, it should be noted however that there may be some 'self-selection' bias in that those who choose to participate in the program, are those that already have some concern over their health. In addition, there are limited means by which the health and safety improvements of the participants can be compared to any general health improvements for those who

are not part of the program. Nevertheless, the improvements to health and safety identified are likely to have been significant.

In summary, there are demonstrated benefits for improved health and wellbeing from participation in the SFF program, and the Future Directions project will contribute to increasing the participation in the program, and improving even further the health and wellbeing outcomes from those who participate.

Summary of Benefits

A summary of the principal types of benefits associated with the outcomes of the investment in the project is shown in Table 3.

Table 3: Categories of Benefits from the Investment

Levy Paying Industries	Spillovers		
	Other Industries	Public	Foreign
Economic benefits			
Saved health costs for future additional participants and their families who will participate in SFF due to evidence provided by the Future Directions project Saved health costs for participants in the Future Directions project due to reinforcement of messages from earlier SFF participation		Saved long-term public health costs due to preventative health, wellbeing and safety measures taken by additional future participants who will participate in SFF due to evidence provided by Future Directions project	
Environmental benefits			
Social benefits			
Improved health, safety and wellbeing of future additional participants and their families who will participate in SFF due to evidence provided by Future Directions project Improved health, safety and wellbeing of all future participants due to changes to program influenced by Future Directions project Improved health, safety and wellbeing for participants in			

the Future Directions project due to reinforcement of messages from earlier SFF participation			

Public versus Private Benefits

The benefits from this research will be both private and public in nature. The private benefits will be in the form of improved health and safety, and improved quality of life, to the individual participants and their families. This will in turn lead to public benefits in terms of public health savings as a result of the preventative action taken by participants.

Distribution of Benefits

The benefits will accrue to the public and to individuals on farms. There are no supply chain costs or benefits. There may however be implications for the rural medical community in terms of increased visits in the short-term, but reduced needs for visits and medication in the longer-term.

Benefits to Other Primary Industries

The SFF program (including the Future Directions component) has had participants from a wide ranging number of agricultural industries including grazing, cropping and horticulture enterprises. It has not yet been extended to the fishing and forestry industries, however there is the possibility that any future program in these industries could draw on the experiences of the SFF program.

Match with National Priorities

The Australian Government's National and Rural R&D Priorities are reproduced in Table 4.

Table 4: National and Rural R&D Research Priorities 2007-08

Australian Government	
National Research Priorities	**Rural Research Priorities**
1. An environmentally sustainable Australia 2. Promoting and maintaining good health 3. Frontier technologies for building and transforming Australian industries 4. Safeguarding Australia	1. Productivity and adding value 2. Supply chain and markets 3. Natural resource management 4. Climate variability and climate change 5. Biosecurity *Supporting the priorities:* 1. Innovation skills 2. Technology

The project investment will contribute to National Research Priority 2. It does not directly contribute to any of the Rural Research Priorities (except perhaps for some indirect impact on Rural Research Priority 1), as none of them are directly targeted at health and safety on farms.

Quantification of Benefits

Benefits Valued

The benefit of the SFF – Future Directions project is quantified through two approaches:

- Firstly, assuming that due to this project there will be more support for the SFF program over the coming years, and therefore the number of individuals and families influenced by the program will increase over what would have occurred if the Future Directions component of the program had not been funded.

- Secondly, assuming that due to changes to the SFF Program prompted by the Future Directions project, participants will have an increased QALY outcome, compared to before the Future Directions project.

Increased Participation

Given that approximately 1,700 individuals have participated in the program over approximately seven years, it is assumed that the participation rate is approximately 240 people per year. It is assumed that without the Future Directions project, this level of participation would have continued over the next 10 years (years ending 30 June 2012 to 2021). However, due to the Future Directions project, this level of participation is assumed to increase by 10%, resulting in an additional 24 participants per annum for 10 years.

The economic analysis of the SFF program undertaken in 2006 concluded that with respect to cardiovascular disease and Type 2 Diabetes, there was a gain of 5.61 quality adjusted life years (QALYs) for 96 participants over ten years (equating to 0.058 QALYs per participant). At the time the study from which this data was sourced was completed, there had been 128 participants, with 104 completing the full process and data available for 97 of those 104. Therefore, the proportion of

original participants who are expected to achieve this gain is 76%. This figure is consistent with the findings of the Future Directions study, where the retention rate of the original 192 participants to those who participated in the Future directions study was 77%. It is therefore assumed that the QALY gain of 0.058 per participant will apply only to 76% of the 24 participants per annum who participate in SFF due to the Future Directions project.

Placing a dollar value on the quality of life (including mortality and morbidity) is a difficult concept. However, Abelson (2003) undertook a study to measure the Australian willingness to pay for avoiding an immediate death of a healthy individual in middle age ($2.5 million). The Abelson figure of $2.5 million has been accepted in the past as an appropriate figure to use for Australian public policy decisions, and was used by Agtrans Research in a previous economic evaluation of farm health and safety R&D projects (Chudleigh and Simpson, 2008).

The $2.5 million is considered to be the value of a statistical life (VOSL), and it can be converted to a constant value of a life year. Allowing a life expectancy of 40 years (from middle age) and a consumer discount rate of 5%, the constant VOSL would be approximately $150,000. This is referred to as the value of a life year (VOLY). A Quality Adjusted Life Year (QALY) is one year of perfect health. Quality of Life (QoL) indices can be used to capture the multiple dimensions of health in a single index number and measure health status on a scale of 1 to 0 where 1 represents a healthy life year and 0 represents death.

The QALY gain per participant of 0.058 is assumed to be achieved over 10 years from the year after the first involvement in the program.

The 2006 economic study (Boymal et al, 2006) estimated the cost of delivering the program per person was $1,087, and that in addition to the costs of running the program, participants themselves had costs of $369 per person as a result of their involvement in the program. This included increased costs for cooking equipment, exercise equipment and health service utilisation. It is assumed that these costs (total of $1,456) occur in the first year of participation in the program.

Improved Health and Safety Outcomes

The Future Directions project has contributed to potentially increasing the effectiveness of the health and safety outcomes from the program. It is assumed that because of the changes made to the program, the QALY gain per participant will increase by 5%. This increase will apply to all future participants, not just those 24 new participants influenced to participate due to Future Directions.

The Counterfactual Situation (Without the Investment)

As stated earlier, without the investment in SFF – Future Directions, it is assumed that the program would have continued at the same size for the next ten years, and that the participants would have continued to achieve health and wellbeing improvements. However, the extent of support for the program, and therefore the number of participants, would not have been as great as is expected with the evidence of success provided by the Future Directions study. The level of health and wellbeing improvement would have continued at 0.058 QALYs per participant, and not increased by 5%.

Summary of Assumptions

A summary of the key assumptions made is shown in Table 5.

Table 5: Summary of Assumptions

Variable	Assumption	Source
Number of participants in future SFF programs per annum without project	240 per annum	Estimated from participation rate to date (1,700 participants over 7 years)
Increase in number of future participants in SFF programs due to project	10%	Agtrans assumption
First year of increased participation rate	2011/12	Final report will be released early in the 2011/12 financial year
Final year of influence on increased participation rate	2020/21	Assumed other studies will have been required by this time to drive continued increases in participation
Improvement in quality of life (QALYs) per new participant influenced to participate due to Future Directions	0.058 per participant over 10 years	Derived from Boymal et al 2006 (QALY increase of 5.61 after 10 years per 97 participants)
Increase in QALYs achieved for all future participants due to improvements to program due to Future Directions project	5% of 0.058 per participant	Agtrans assumption
Proportion of participants achieving improvement	76%	Derived from Boymal et al, 2006 and Brumby et al, 2011
Value of a QALY	$188,747 (2010/11 $ terms)	Derived from Abelson, 2003 ($150,000 in 2003$ terms)
Additional program delivery and health and wellbeing management costs per participant	$1,678 (2010/11 $ terms) (calculated from $1,456 one-off cost per participant in 2005/06 $ terms)	Derived from Boymal et al 2006

Results

Overall Return on Investment

All past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to the first year of investment using a discount rate of 5%. The base run used the best estimates of each variable, notwithstanding a high level of uncertainty for many of the estimates. All analyses ran for 40 years including the first year of investment. Investment criteria were estimated for both total investment and for the Program investment alone. The investment criteria are reported in Table 6. The results show that the benefit cost ratio is 5.6 to 1. It is noted that this is possibly an underestimate of the benefits from the program, as the analysis only values the health benefits with respect to cardiovascular disease and Type 2 diabetes. There may also be benefits from the program with respect to other health and wellbeing issues (e.g. cancer, mental health), as well as improved farm safety.

Table 6: Investment Criteria for Total Investment and Program Investment

(Discount rate 5%, 40 years)

Criterion	Program Investment only	Total Investment
Present value of benefits ($m)	1.12	1.39
Present value of costs ($m)	0.20	0.25
Net present value ($m)	0.92	1.14
Benefit cost ratio	5.57	5.59
Internal rate of return (%)	21.3	21.5

Sensitivity Analyses

Sensitivity analyses were carried out on a range of variables and results are reported in Tables 7 and 8. All sensitivity analyses were performed on the total investment only using a 5% discount rate (with the exception of Table 7) with benefits taken over the 40 year period. All other parameters were held at their base values.

Table 7 shows that the investment criteria are somewhat sensitive to the discount rate.

Table 7: Sensitivity to Discount Rate

(Total Investment, 40 years)

Criterion	Discount Rate		
	0%	5% (Base)	10%
Present value of benefits ($m)	2.68	1.39	0.76
Present value of costs ($m)	0.26	0.25	0.24
Net present value ($m)	2.43	1.14	0.52
Benefit cost ratio	10.43	5.59	3.16

Table 8 shows the sensitivity of the investment criteria to the assumption of the potential QALY improvement. The base assumption is a 0.058 QALY improvement per participant. The analysis shows that the investment criteria are somewhat sensitive to the QALY improvement. This is because the implementation costs per participant do not change, but the level of benefit they receive does change. The break-even QALY improvement (at a 5% discount rate) is 32% of the assumed base QALY of 0.058.

Table 8: Sensitivity to the Assumed QALY Improvement

(Total Investment, 5% discount rate; 40 years)

Criterion	QALY improvement per participant		
	Half of base	0.058 (base)	Double base
Present value of benefits ($m)	0.55	1.39	3.06
Present value of costs ($m)	0.25	0.25	0.25
Net present value ($m)	0.30	1.14	2.81
Benefit cost ratio	2.23	5.59	12.32
Internal rate of return (%)	11.1	21.5	33.4

Confidence Rating

The results produced are highly dependent on the assumptions made, many of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes

A confidence rating based on these two factors has been given to the results of the investment analysis (Table 9). The rating categories used are High, Medium and Low, where:

High: denotes a good coverage of benefits or reasonable confidence in the assumptions made

Medium: denotes only a reasonable coverage of benefits or some significant uncertainties in assumptions made

Low: denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 9: Confidence in Analysis

Coverage of Benefits	Confidence in Assumptions
Medium	Medium

Conclusions

The investment in this project has contributed to demonstrating the impact of the Sustainable Farm Families approach to improving health and safety on farms. This will in turn contribute to continued funding of the program, and continued interest in the program by farming families. The benefits from the project have been estimated by valuing the improvements in health for those participants who would not have been a part of the futureSFF program if the Future Directions project had not been undertaken. A small increase in the health and wellbeing outcomes for all participants is also valued.

Given the assumptions made and a discount rate of 5%, the total investment of $0.25 million (present value of costs) was estimated to produce expected total benefits of $1.39 million (present value of benefits) giving a net present value of $1.14 million and a benefit-cost ratio of 5.6 to 1. The internal rate of return was 21.5%.

Acknowledgments

Susan Brumby, Western District Health Service

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Chudleigh, P. and Simpson, S. (2008) Farm Health and Safety Joint Research Venture Impact Evaluation. RIRDC Publication No. 08/141.

Annex 1: Results for CRRDC Process

As for the results presented earlier, all past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to the year of analysis (2010/11) using a discount rate of 5%. These results are shown in Table A.1 and A.2 and reported for different periods of benefits with year 0 being the last year of investment. Benefits ran for a maximum period of 30 years from year 0. Investment criteria were estimated for both total investment and for the Program investment alone.

Table A.1: Investment Criteria for Total Investment and Total Benefits

(discount rate 5%)

	0 years	5 years	10 years	15 years	20 years	25 years	30 years
Present value of benefits ($m)	0.00	0.08.	0.67	1.33	1.53	1.53	1.53
Present value of costs ($m)	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Net present value ($m)	-0.27	-0.19	0.39	1.06	1.26	1.26	1.26
Benefit cost ratio	-	-0.29	2.43	4.86	5.59	5.59	5.59
Internal rate of return (%)	-	neg	15.5	20.9	21.4	21.4	21.4

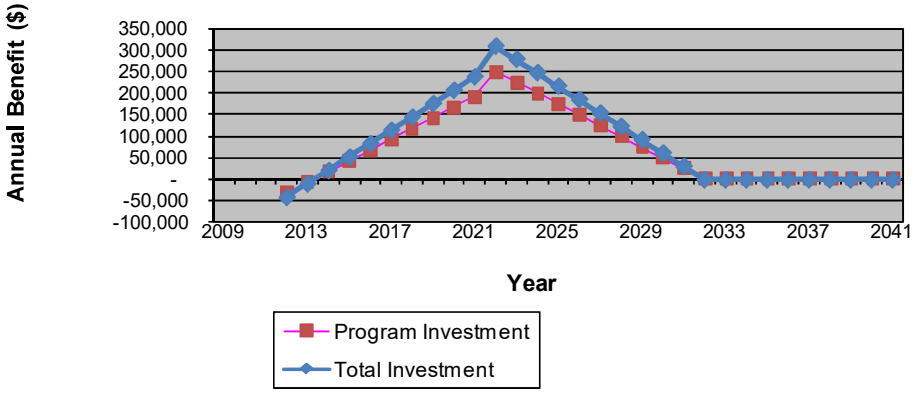
Table A.2: Investment Criteria for Program Investment and Program Benefits

(includes both RIRDC and industry contributions; discount rate 5%)

	0 years	5 years	10 years	15 years	20 years	25 years	30 years
Present value of benefits ($m)	0.00	0.06	0.54	1.08	1.24	1.24	1.24
Present value of costs ($m)	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Net present value ($m)	-0.22	-0.16	0.32	0.85	1.02	1.02	1.02
Benefit cost ratio	-	0.29	2.42	4.84	5.57	5.57	5.57
Internal rate of return (%)	-	neg	15.4	20.7	21.3	21.3	21.3

The flow of annual benefits is shown in Figure A.1 for both the total investment and for the Program investment.

Figure A.1: Annual Benefits



Appendix 2: Impact Assessment of Investment in Testing and Delivering Media Communication Strategies for Child Farm Safety

Background

The farm environment can hold many safety hazards, especially for children. Examples include machinery, water bodies and vehicles. Farmsafe Australia reports that approximately 20 children under 15 years are fatally injured on Australian farms each year. In addition, many more children are treated medically for injuries as a result of farm accidents.

Farmsafe Australia is an association of national agencies that share a common interest in Australian farm safety. It was incorporated in 1993 as an Association, and leadership of the association comes from the agriculture industry. Farmsafe Australia has implemented a range of programs and projects aimed at enhancing the well-being and productivity of Australian agriculture through improved farm health and safety awareness and practices. One of these programs is the Child Safety on Farms (CSF) program. Farmsafe Australia consulted with peak farmer groups and researched data from the Australian Centre for Agricultural Health and Safety (ACAHS) (based at the Moree and part of the University of Sydney) in order to develop priorities for child safety on farms. The ACAHS developed a number of publications for farm families relating to key child injury risks on farm and best practice safety recommendations. Farmsafe Australia was also involved in the development of these resources, and used communication and media tools to promote child farm safety messages widely.

It was thought timely to assess the success of the various media communication strategies utilised by the program. A project was funded by the Farm Occupational Health and Safety Program (now the Farming and Fishing Health and Safety Program, managed by RIRDC) in order to make this assessment and identify areas for improvement in media communication strategies. The investment in the assessment project is the subject of the following economic evaluation.

The Project

There is one project included in this analysis. Table 1 details the Project Number, Project Title, Research Organisation, Principal Investigator and Period of Research for the project.

Table 1: Summary of Project Details

Project Number	Project Title	Other Details
PRJ-000652 (USA-14A)	Testing and delivering media communication strategies for child farm safety	Research Organisation: University of South Australia Period: October 2004 to October 2008 Principal Investigator: Lia Bryant

Project Objectives

The objectives for the project were:

- To identify and evaluate the effectiveness of all aspects of the Farmsafe Australia Communications Strategy for the Child Safety on Farms Program (e.g. webpages, booklets, communication programs, articles in newspapers, newsletters, television, radio)

- To use case studies of a random sample of farm families from a selection of industries within SA, WA, Qld and NSW to test responses of adults and children who are over seven years of age to media communication strategies currently used, being developed and new strategies written by the steering committee

- To assess effectiveness of media strategies prior to implementation

Project Costs

Estimates of the annual total investment in the project are provided in Table 2. All investment was by the Program with no other researcher or industry contributions.

Table 2: Estimate of Investment in the Project (nominal $; including Program and other contributions)

Year ending June	2005	2006	2007	Total
Program	49,100	33,977	11,326	94,403
Others	0	0	0	0
Total	49,100	33,977	11,326	94,403

Project Description

A range of data was collected to determine the effectiveness of the Farmsafe Australia Child Safety on Farms Strategy. These included:

- Telephone interviews with 18 representatives and workers involved in child farm safety including CSF workers, committee members from Farmsafe Australia and organisational representatives with an interest in child safety on farms. The representatives were from all states and territories except ACT.
- Fourteen focus groups with rural community representatives in South Australia, Victoria, New South Wales, Queensland and Western Australia. The average group had eight participants and included farm parents and grandparents, representatives from rural based businesses, healthcare professionals, educators and members of local government.
- Thirty-two focus groups held in five states with school aged children in four age cohorts (7-9 years; 10-12 years; 13-15 years; and 16+ years).

The telephone interviews included both short, closed questions utilising ranking scales, as well as open qualitative questions to illicit evaluative feedback on the specific strategies and overall messages used in the CSF communication strategies (both current and prospective strategies).

The focus groups were run by a facilitator and included direct questioning and discussion on each of the communication strategies used by the CSF program. The media and communication strategies used by the CSF program and evaluated by the focus groups include:

- Child Safety Checklist
- Safe Play Area brochure and guide
- Child Safety on Farms Guidance Notes

- Get Going booklet
- Poster
- Fridge magnet
- Safety on the Land kit
- Radio public service announcements
- TV advertisement

A seminar was held in Canberra during the project. The seminar provided an opportunity for researchers, consultants and child farm safety organisations to discuss the findings of the telephone interviews and focus groups, and develop recommendations relating to the development of media and communication tools in the future.

Outputs

A large report detailing the results of the surveys and focus groups was prepared and submitted to RIRDC but was not published; a short summary report was instead published. The report was also provided to Farmsafe Australia.

The key findings from the telephone interviews with CSF workers and representatives included:

- The group had a high awareness of the CSF program key themes (including seatbelts, riding in back of utes, 4-wheel motorbikes, helmet use on bikes/horses).

- The CSF media and communication tools were highly rated by the group, with the Child Safety Checklist and Safe Play Area brochure and guide the most commonly known and used resources.

- There is a need to brand the media and communication strategies as there is no linkage identifying that they come from the same reputable source.

- There should be a focus on up and coming farmers (e.g. agricultural schools, traineeships) as those individuals are going to be the future parents on farms.

- Field days, agricultural meetings and regional radio could be better utilised by the program for communication purposes.

- Full-time coordinators in states (not just based on volunteers) and a tightening up of networks (i.e. communication between various Farmsafe groups) would be valuable improvements.

The key findings from the adult focus groups included:

- Most of the participants had not been aware of the material prior to the focus groups, and did not have access to the resources within their communities.

- The adult groups considered that the Safety on the Land Kit, the Safe Play Area brochure and guide, the Child Safety Checklist and the television advertisements would be the most effective communication tools. The poster, radio announcements and magnet were considered the least effective.

- There was a need to distribute targeted resources for particular issues related to particular industries.

- Clear, simple, succinct and visually appealing resources were the best method of communicating messages to the general rural public, children and farmers. There was criticism

of those resources (particularly the magnet and poster) where a clear correlation between written text and visual images was absent.

- It was suggested that the use of local community members in the television and radio advertisements could increase their legitimacy and authenticity. In addition it was thought that more graphic and confrontational images of hazards and accidents would increase the likelihood of future compliance to farm safety regulations.

- It was suggested that "the use of rural citizens and local workers for resource distribution and further training and development of rural community members in farm safe practices would be the most effective method in achieving community trust and compliance".

Key findings from the school-aged focus groups included:

- Children in the 7-9 and 10-12 years of age cohorts demonstrated an understanding of the safety message of all media materials, but interpreted the poster's message in a variety of ways.

- The Safety on the Land Kit provided the strongest safety message to children within the 7-9 year age cohort.

- Students aged 13-15 years found the poster confusing and those aged 16+ thought that younger children would be confused by it.

- Students aged 13-15 rated the fridge magnet highly and those aged 16+ thought that television and the use of cartoons were effective in attracting the attention of teenagers.

- The primary school students were asked to draw their own CSF poster and high school students were asked to construct their own media tools. The resulting posters and products showed some innovative initiatives.

Following the analysis of the interviews and focus groups, as well as the seminar held in Canberra to discuss the results, a number of key recommendations were made with respect to further research, and improved service delivery. The key recommendations relating to further research were:

- That action research be undertaken with children in age cohorts to develop age appropriate media strategies.

- That research funding be available for the development of media tools for children aged 10-12 and teenagers aged 13-15 years and 16+ years.

- That action research be undertaken in classrooms to identify age-appropriate ways to include CSFmessages in kindergartens and in primary school curriculum.

- That qualitative research be undertaken to identify meanings of potential confrontational media messages and impact of those messages.

The key recommendations for service delivery were that Farmsafe Australia:

- Develop different mechanisms for distribution of written materials.

- Redevelop the poster and consider ways in which written material in the community domain should be child/teenager friendly.

- Promote increased radio interviews and announcements especially targeted at farm parents and grandparents as they are less likely to read mailed media tools.

- Consider branding of all written material, so it is obvious it has all come from the same reliable source, and is easily recognised.

- Work together with farming industries to obtain funding and develop industry specific media tools.

Outcomes

To date, there has been limited adoption of the recommendations from this report in terms of further development of child safety media and communication materials. The recommendations with respect to funding research specifically aimed at identifying the best strategies to target individual age cohorts has also not been undertaken.

A number of the recommendations related to the need for media and communication tools to be more directly targeted at children. At the time the project was being undertaken, the CSF Program was in the process of developing a farm safety resource specifically aimed at implementation in the classroom. This resource was not able to be included in the group of materials reviewed by the focus groups as it was not yet complete. Many of the recommendations made with respect to targeting children more specifically were already being incorporated into this new resource. Therefore, while this new resource does in some part address a number of the recommendations, the direct influence of the project on the resource was relatively insignificant.

The validity of a number of the other recommendations is recognised, and there is the potential to incorporate such recommendations into the design of media and communication materials and strategies in the future. However, the release of the projects findings coincided with significant reductions in the funding for the child safety on farm program, and there has been little scope to produce new materials or develop new campaigns that can incorporate the recommendations.

Despite no real scope for adopting the recommendations in a direct way to date, those involved with the ongoing child farm safety activities are aware of the report and its recommendations, and it may have had some indirect impact on the ongoing activities. It is anticipated however, that if resources allow it in the future, many of the recommendations will be taken on board in a more direct way than currently.

Benefits

Due to the limited adoption of the findings from the report to date, there are few benefits to date, and any potential benefits from the project are therefore likely to occur in the future. The major potential benefits from the investment relate to the potential for the findings to improve the effectiveness of Farmsafe Australia's CSF communication messages. It could do this through ensuring that the messages conveyed by the various communication and media tools, are conveyed more widely, strongly and succinctly than they may be without the knowledge provided by the project. There is also the potential for the communication and media messages to be more targeted at specific age cohorts.

This means that Farmsafe Australia and others involved in the promotion of the child farm safety message will be able to have a greater impact on adoption of safety best practice. Through increasing the awareness and adoption of these best practices, there is likely to be a reduction in the rate of child death and injury on farms.

The impact of the Farmsafe Australia child safety on farms strategy prior to this project is thought to have been significant, however there is no data to support a causal link between the strategy and reductions in child fatalities on farms. Data from the National Farm Injury Data Centre did indicate that there had been a significant reduction in child fatalities on farms from the 1989-92 period to the 2001-2004 period, however more recent data is not available. The ACAHS reported in January 2011 that agricultural field day surveys between 2003 and 2008 (3000 farmers surveyed) showed that there had been an increase in child safety awareness and practices over this period. It was also reported that

the range of guidelines and publications produced relating to child safety on farms had been picked up and promoted by State government departments (e.g. Department of Community Services in NSW and Department of Child Safety in Queensland), and that the guidelines had also been adopted by the NSW Child Deaths Review Team in the investigation of child deaths in that state.

The impact of a child being severely injured of dying in a farming accident is great. As well as the loss of the child itself, the emotional toll associated with the loss and grief can have far-reaching impacts in terms of the health and wellbeing of the family members. The productivity of the farm family and farm workers is likely to be impacted due to these impacts on health and wellbeing. In addition, there is a range of costs to families and to the public in terms of hospital and other injury treatment expenses.

Summary of Benefits

A summary of the principal types of benefits associated with the outcomes of the investment is shown in Table 3.

Table 3: Categories of Benefits from the Investment

Levy Paying Industry	Spillovers		
	Other Industries	Public	Foreign
Economic benefits			
Potentially more efficient use of industry media and communication resources regarding child farm safety. Potentially increased productivity on farms due to reduced worry and concern.		Potentially reduced public health costs associated with child injury and death on farms. Potentially more efficient use of public media and communication resources regarding child farm safety.	
Environmental benefits			
Social benefits			
Potentially reduced risk of child injury and death on farms.		Potentially reduced risk of child injury and death on farms.	

Public versus Private Benefits

The potential benefits from this research will be both public and private in nature. The public benefits will be in the form of efficiencies in public spending on media and communication strategies for child farm safety, and reduced risk of injury and death on farms with associated health care costs. Private (industry) benefits will also be in the form of reduced risks of child injury and death on farms, and efficiencies in industry spending on communication strategies.

Distribution of Benefits

The benefits will accrue to the public and to individuals on farms. There are no direct supply chain costs or benefits.

Benefits to Other Primary Industries

The benefits from this research will potentially accrue to all primary industries.

Match with National Priorities

The Australian Government's National and Rural R&D Priorities are reproduced in Table 4.

Table 4: National and Rural R&D Research Priorities 2007-08

Australian Government	
National Research Priorities	**Rural Research Priorities**
1. An environmentally sustainable Australia 2. Promoting and maintaining good health 3. Frontier technologies for building and transforming Australian industries 4. Safeguarding Australia	1. Productivity and adding value 2. Supply chain and markets 3. Natural resource management 4. Climate variability and climate change 5. Biosecurity *Supporting the priorities:* 1. Innovation skills 2. Technology

The project investment will contribute to National Research Priority 2. It does not contribute to any of the Rural Research Priorities, as none of them focus on health and safety. There may be some minor contribution to Rural Research Priority 1 through the avoidance of lost productivity on the farm that can occur as a result of the trauma of a death of a child within the farm family.

Quantification of Benefits

Benefits Valued

The benefits from this project are estimated through assuming that the lessons learnt from this project, and potential adoption of subsequent recommendations, will potentially lead to improved delivery of child farm safety messages, and therefore adoption of child farm safety best practice. Subsequently, it can be assumed that there may be an improvement in child farm safety (and reduced probabilities of death and injury) that can be attributed to this project.

While it is recognised that it is a difficult subject, valuing the benefits from lowering the accidental death of small children on farms is best achieved by valuing the life of a child and estimating the value of a reduction in the probability of the death rate. There are many approaches to valuing a year of life of a human being. The approach taken in this analysis is based on a willingness to pay (WTP) study by Abelson (2003) who undertook a study to measure the Australian WTP for avoiding an immediate death of a healthy individual in middle age. This value was calculated as $2.5 million, which can be converted to an annual value of a statistical life (VOSL) or a value of a life year (VOLY) of $150,000 (using a life expectancy of 40 years and a consumer discount rate of 5%). This value is inclusive of medical and emotional costs. More detail on the method for developing this value is provided in

Chudleigh and Simpson (2008). If a Value of Life Year (VOLY) is valued at $150,000 per year, and the life expectancy of a 0-15 years (average 7.5 years) child is 70 additional years, the value of a statistical life (VOSL) for a child 0-15 years is valued at $2.9 m, using a discount rate of 5%.

The number of children 0-15 years of age living on farms is estimated at 135,000 (adapted from ABS, 2003). At 20 deaths per year, the probability of a farm death for a child 0-15 years based on the best available data is 20/135,000 = approximately 0.000148 per annum. If the application of child safety programs reduced (for example) the death rate from 20 to 19 each year, the probability of death would be reduced to 0.000141, or a reduction of 0.000007 in the probability of any one of the 135,000 children dying from farm accidents each year. While this analysis assumes a drop in the death rate of 1 death per year, there is no data or evidence on which to base this assumption. It is therefore used only to be indicative of the scale of benefits likely, if the research has contributed to the avoidance of one death (e.g. in reality, the death rate may have increased due to a range of other factors, but the media and communication strategies may still have contributed to avoiding one extra death).

In addition to the project analysed here (PRJ000652) there is a wide range of other research and extension programs that would contribute to this change in behaviour and reduction in the probability of a child death or injury on-farms (for example, development of safety devices and other awareness programs). It is therefore assumed that this project to improve the media and communication activities relating to child farm safety would have been only one small part of the total contribution to this reduction. A 5% attribution factor to this individual project is assumed to the saving of 1 child death per annum. In addition, as highlighted earlier, the actual use of the project's outputs to date has not been significant, and any potential benefit depends on the opportunity to use the potential benefits in the future. Therefore a probability of this actual use occurring of 25% is assumed. The first year of the use of the recommendations is assumed to be 2012/13, with the benefits assumed to commence in 2013/14 and end after ten years in 2022/23. The benefits are curtailed as the influence of the projects findings on media and communication tools, and the use of those communication tools, is likely to be less efficacious over time as farm practices and innovations change.

The Counterfactual Situation (Without the Investment)

It is assumed that without the investment in PRJ000652 the media and communication strategies associated with child farm safety would have continued to be delivered using the same methods and tools as in the past. Therefore, the efforts in this area would have continued to achieve the same impact on preventing child death and injury on farms, as before the study was done.

Summary of Assumptions

A summary of the key assumptions made is shown in Table 5.

Table 5: Summary of Assumptions

Variable	Assumption	Source
VOLY for a child	$3.65 million	Calculated from Abelson, based on a life expectancy of 70 years from mid-childhood; and after converting $ terms from 2003 to 2011
Number of children under 15 years on farms	135,000	Adapted from ABS, 2003
Number of child deaths annually without intervention to promote best practice for child safety on farms	20	From Child Safety on Farms website, based on 2004 data

Probability of child death without intervention	0.000148	Calculated from above
Number of child deaths annually with intervention to promote best practice for child safety on farms	19	Agtrans estimate
Probability of child death with intervention	0.000141	Calculated from above
Reduction in annual probability of death per child	0.000007	Calculated from above
Attribution of benefit to PRJ000652	5%	Agtrans assumption
Probability of future use of research outputs to achieve assumed benefit	25%	Agtrans assumption
First year of benefits	2013/14	Agtrans assumption
Final year of benefits	2022/23	Agtrans assumption

Results

Overall Return on Investment

All past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to the first year of investment using a discount rate of 5%. The base run used the best estimates of each variable, notwithstanding a high level of uncertainty for many of the estimates. All analyses ran for 40 years including the first year of investment. Investment criteria are estimated for both total investment and for the Program investment alone (note however that for this project, there was no additional investment from the researchers or industry). The investment criteria are reported in Table 6. It should be noted that this may be an underestimate, as reduced mortality only and not morbidity (injury) has been included in the analysis. It is assumed that parents and family suffering is implicitly included in the value of the willingness to pay estimate.

Table 6: Investment Criteria for Total Investment and Program Investment

(discount rate 5%)

Criterion	Program Investment	Total Investment
Present value of benefits ($m)	0.24	0.24
Present value of costs ($m)	0.11	0.11
Net present value ($m)	0.13	0.13
Benefit cost ratio	2.21	2.21
Internal rate of return (%)	12.0	12.0

The results of the analysis are partly influenced by the low investment in the project (represented by the PVC). It is also influenced by the nature of the high values associated with reductions in the probability of death or severe injury. Due to the high value of the life of a child, even small contributions to improved safety can lead to significant benefits when measured in this way.

Sensitivity Analyses

Sensitivity analyses were carried out on a range of variables and results are reported in Tables 7 to 9. All sensitivity analyses were performed using a 5% discount rate (with the exception of Table 7) with benefits taken over the 40 year period. All other parameters were held at their base values.

Table 7 shows that the investment criteria are somewhat sensitive to the discount rate.

Table 7: Sensitivity to Discount Rate

(Total Investment, 40 years)

Criterion	Discount Rate		
	0%	5% (Base)	10%
Present value of benefits ($m)	0.46	0.24	0.13
Present value of costs ($m)	0.11	0.11	0.10
Net present value ($m)	0.35	0.13	0.03
Benefit cost ratio	4.12	2.21	1.25

Table 8 shows the sensitivity of the investment criteria to the assumptions of the number of child deaths prevented by the child safety effort. The base scenario assumes 1 child death is avoided per annum. The number of child deaths required to be avoided for the investment to break-even at a 5% discount rate was estimated at 0.5 deaths per annum (assuming all other assumptions remain equal).

Table 8: Sensitivity to Assumption Relating to Number of Child Deaths Avoided

(Total Investment, 5% discount rate; 40 years)

Criterion	Number of child deaths avoided per annum		
	0.5	1	2
Present value of benefits ($m)	0.12	0.24	0.48
Present value of costs ($m)	0.11	0.11	0.11
Net present value ($m)	-0.01	0.13	0.37
Benefit cost ratio	1.11	2.21	4.43
Internal rate of return (%)	5.9	12.0	18.8

Table 9 shows the sensitivity of the investment criteria to the assumption of the probability of the outputs being used in the future. The base assumption used in the analysis was 25%. The probability of use of research outputs required for the investment to break-even at a 5% discount rate is 11% (assuming all other assumptions remain unchanged).

Table 9: Sensitivity to Probability of Use of Research Outputs

(Total Investment, 5% discount rate; 40 years)

Criterion	Probability of Use of Research Outputs		
	10%	25% (base)	50%
Present value of benefits ($m)	0.10	0.24	0.48
Present value of costs ($m)	0.11	0.11	0.11
Net present value ($m)	-0.01	0.13	0.37
Benefit cost ratio	0.89	2.21	4.43
Internal rate of return (%)	4.0	12.0	18.8

Confidence Rating

The results produced are highly dependent on the assumptions made, many of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes

A confidence rating based on these two factors has been given to the results of the investment analysis (Table 10). The rating categories used are High, Medium and Low, where:

High: denotes a good coverage of benefits or reasonable confidence in the assumptions made

Medium: denotes only a reasonable coverage of benefits or some significant uncertainties in assumptions made

Low: denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 10: Confidence in Analysis

Coverage of Benefits	Confidence in Assumptions
Medium	Low

Conclusions

The project was successful in providing an evaluation of the performance of a range of communication and media tools used to promote messages regarding child safety on farms. There is the potential for the findings and recommendations from the evaluation to be used by those developing child safety media and communication materials to enhance the effectiveness of those materials, and therefore increase the adoption of child safety practices on farms. Such adoption could lead to a subsequent reduction in the probability of a child being fatally injured on a farm.

However, to date, there has been little usage of the projects outputs, largely due to a reduction in funding for child farm safety campaigns. In addition, time lags in data regarding deaths on farms and difficulties in determining any causal links between safety campaigns and subsequent reductions in death and injury rates led to difficulties in estimating the benefits from the research. Despite this, a probabilistic approach to valuing the potential benefits from the project's outputs was used in this analysis, and the expected return to the research is 2.2 to 1. This benefit-cost ratio is influenced by the low value of the investment (present value of costs of $0.11m) and the high value of life of a child.

Acknowledgments

Julie Depczynski, Farmsafe Australia

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Annex 1: Results for CRRDC Process

As for the results presented earlier, all past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to the year of analysis (2010/11) using a discount rate of 5%. These results are shown in Table A.1 and A.2 and reported for different periods of benefits with year 0 being the last year of investment. Benefits ran for a maximum period of 30 years from year 0. Investment criteria were estimated for the Program investment (there were no other contributions from the researcher or industry).

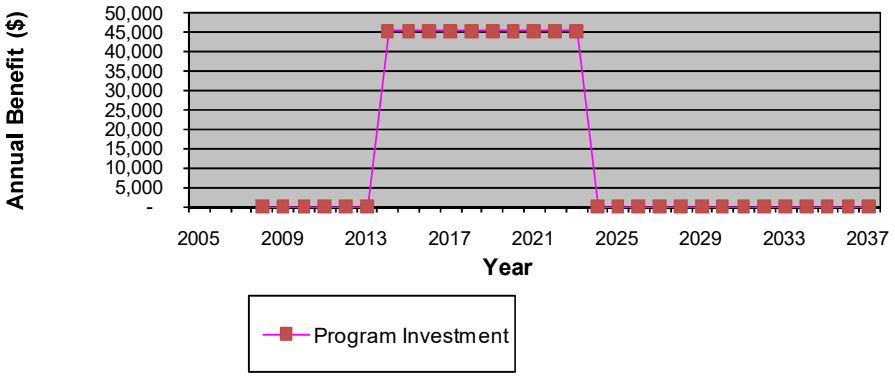
Table A.1: Investment Criteria for Program Investment and Program Benefits

(discount rate 5%)

	0 years	5 years	10 years	15 years	20 years	25 years	30 years
Present value of benefits ($m)	0.00	0.00	0.10	0.19	0.21	0.21	0.21
Present value of costs ($m)	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Net present value ($m)	-0.12	-0.12	-0.02	0.07	0.09	0.09	0.09
Benefit cost ratio	-	-	0.81	1.62	1.76	1.76	1.76
Internal rate of return (%)	neg	neg	2.8	9.3	9.9	9.9	9.9

The flow of annual benefits is shown in Figure A.1 for the Program investment.

Figure A.1: Annual Benefits



Appendix 3: Impact Assessment of Investment in Farm Safety Studies

Background

The health and safety of those living and working on farms has been of concern to those involved with agricultural industries for many years. The National Farm Injury Data Centre reports that the rate of work-related deaths and workers' compensation claims in agriculture ranks among the highest 2-3 industries Australia-wide. There has been ongoing work by the National Farm Injury Data Centre and a number of Commodity Specific Reference Groups in order to identify key risk factors and address key issues (e.g. tractor safety, farm workshop safety, child safety) in this on-farm area. There has also been significant investment in training and exploring possible incentives for uptake of Occupational Health and Safety(OHS) risk management programs on farms. However, improvingadoption of safe farm practices has been complicated by the family business nature and scattered structure of farm–based industry.

In order to improve understanding of the factors contributing to safe farm practices, more knowledge was needed on the perceptions of, and attitudes to, safety on farms by those who live and work on farm. In addition, knowledge was needed on how information about farm OHS is received and used on farms, what impediments and costs are associated with uptake and the practical benefits that accrue from increased attention to safety.

Prior to the funding of the project being analysed here, most information on OHS risk and health outcomes on farms has been from surveys at one point in time or from data collected for other purposes (e.g. coroners reports, insurance data). There was also not much information collected on the uptake and impact of farm safety programs. It was felt that a longitudinal study was needed to engage with farmers and their families and workers to gather information about the nature and scale of the OHS problem on farms.

There was also a need to continue to collate and report a wide range of data on OHS practices and incidents on farms, as the National Farm Injury Data Centre has been doing for a number of years (based at the Australian Centre for Agricultural Health and Safety (ACAHS) at Moree). The funding provided by the project analysed here allowed for such work to continue.

The Projects

There is one project included in this analysis. Table 1 details the Project Number, Project Title, Research Organisation, Principal Investigator and Period of Research for the project.

Table 1: Summary of Project Details

Project Number	Project Title	Other Details
PRJ-000541 (US-141A)	Farm safety studies	Research Organisation: University of Sydney (ACAHS) Period: October 2005 to July 2007 Principal Investigator: Lyn Fragar

Project Objectives

The objective of the project is to improve the ability of Australian agriculture to manage risk of injury through:

- The provision of accurate, timely, concise and relevant data about injury occurring on farms or due to agricultural work; and
- The establishment of a population of people who have agreed to participate in a five-year study of enterprise OHS risk factors and personal health related to work and life in agricultural production.

Project Costs

Estimates of the annual total investment in the project are provided in Table 2.

Table 2: Estimate of Investment in PRJ-000541 (nominal $; including Program and other contributions)

Year ending June	2006	2007	2008	Total
Program	107,323	106,690	26,673	240,686
Other[a]	131,577	136,555	0	268,132
Total	238,900	243,245	26,673	508,818

[a] Includes contributions from research organisation and industry

Project Description

The project contained a number of components, including updating and publication of data, updating and publication of industry guides and the establishment of a baseline for a longitudinal survey of industry with respect to farm safety.

With respect to the longitudinal survey, the project included the establishment of a project steering group with representation of the collaborating research partners that included NSW Famers and the cotton industry. The survey was distributed widely within a number of Statistical Local Areas (SLAs), and across a number of enterprise types across NSW. A cohort group of 335 farm enterprises were recruited into the study, from six SLAs in NSW, and from a range of enterprise types including cattle, sheep, grains, horticulture, cotton, dairy and sugarcane. A large number of the enterprises were mixed enterprises. The 335 responses came from a mail out of 8,880 information packages seeking participation in the study. The addresses for the mail out were rural addresses sought from the Australian Electoral Commission, and may have included farms that did not derive an income from agriculture. It was acknowledged when reporting the results of the survey that is likely to be some self-selection and non-respondent bias in the survey, however no adjustments were made to the results to allow for this.

There were six sections to the questionnaire including:

1. Demographics
2. Safety climate (relates to the perceptions of farm health and safety)
3. Safety management systems (relates to the management of health and safety on the farm)
4. Control of major safety hazards (relates to the management of priority hazards identified by Farmsafe Australia)
5. Free text questions relating to recent safety changes made on farm, prompts to make these changes, and current safety risks or issues
6. Injury reporting, including questions relating to injuries that occurred on the farm

Sections 2 to 4 of the questionnaire included a total of 70 questions that were to be answered using 'Yes', 'No', 'To some extent' or 'Not sure'. The results for these sections were recorded as percentage scores, and a general linear model was applied to the data collected to determine whether variables such as age, gender and enterprise influenced the scores.

While the survey was described as 'longitudinal' it is only the establishment of the survey cohort and an initial baseline survey that were carried out as part of this project. Any future survey of the cohort group will be carried out under separate funding.

The project also involved maintaining the National Farm Injury Data Centre death registers (Farm Injury Optimal Data Set), using a combination of data from National Coroners Information System (NCIS), Health Outcomes Information Statistical Toolkit (HOIST), National Occupational Health and Safety Commission (NOHSC) and Australian Bureau of Statistics (ABS) data, as well as through monitoring of the press.

The other major component of the project related to the creation and publication of a wide range of publications, commonly referred to as 'chartbooks'. These 'chartbooks' are largely based on the data collected and collated by the National Farm Injury Data Centre, as well as data from other surveys.

Outputs

The results of the survey carried out were submitted to RIRDC in a final report, but that report has not yet been published. The survey results were also published as part of a PhD thesis (Pollock, 2010). The key findings were:

- There were 335 farm owner/manager participants in the survey. Almost 80% of the respondents were male, and their ages ranged from <25 years to >65 years. The most common age grouping was 45-54 years. Owners and/or managers made up 70% of the respondents. Mixed enterprises made up 65% of the respondent farms. Grains and livestock were the most frequently reported industry mix, followed by those who farmed only cattle, and mixed cattle and sheep farmers.

- The most common prompt for farmers to make safety changes in the past 12 months was related to meeting regulatory requirements (28%). The next most important prompts were: belief in importance of safety; old equipment unsafe; response to media or promotion campaign; replace system to improve productivity; good business management; OHS or other training; accident or near miss; safety of employees.

- Barriers or concerns relating to implementation of farm safety measures were reported as: safety planning; drought impact on safety; resource constraint; age of people at risk; human limitations/problems; nature of farm work; difficulties in safety program; frustrations with OHS demands; lack of control over visitors and contractors.

- On average, younger respondents had more negative attitudes towards farm safety than older respondents. With respect to grain farmers however, the responses revealed that this positive commitment from older farmers did not translate to the actual implementation of safety on farms. Interestingly, the reverse applied to younger farmers where there were more negative attitudes but more effective systems in place.

- Females tended to have more positive attitudes towards farm safety than males.

- Sheep farmers had the least positive attitudes to farm safety when considering results by enterprise type. Cotton and horticulture enterprises performed strongly with respect to having safety management systems in place. Cattle enterprises scored relatively low with respect to the control of major safety hazards when compared to other enterprises (e.g. tractors,

machinery guarding, workshop safety, chemical safety, vehicle and road safety, helmets, working from heights and child safety).

- For a number of industries, links were made between the experience of that industry as a whole with quality assurance programs, and their likelihood of industry members adopting OHS practices.

- There had been an average of 2.4 safety changes per farm in the 12 months prior to the survey.

- There is a disconnect between what farmers perceive as the risks on their farm and what hazards and risks actually cause the highest rates of fatalities. For example, the highest ranked risk reported by farmers was livestock handling, followed by silos and chemical handling. However, while these agents are relatively common causes of minor injuries, they do not feature highly in the causation of deaths on Australian farms. In contrast, farmers saw ATVs as safer than 2-wheeled motorcycles or horses, when they are in fact responsible for more traumatic deaths.

As well as the survey, a range of other data collection and collation activities were undertaken. These included the maintenance of the Farm Injury Optimal Data Set as well as the use of that data, together with information collected and collated elsewhere, to produce a series of publications often referred to as 'chartbooks'. These publications included:

- A publication titled "The mental health of people on Australian farms: The Facts – 2008"

- A publication titled "Health and safety in older farmers in Australia: The Facts – 2007"

- A publication titled "Traumatic deaths in Australian Agriculture: The Facts – 2007"

- A publication titled "Vehicle injury associated with Australian Agriculture: The Facts -2008"

- A publication titled "The safety of young people in Australian Agriculture: The Facts – 2008"

- An on-farm OHS risk management package for the Sugarcane industry titled "Managing Sugar Cane Production Safety" was developed and published by RIRDC in 2007. It was largely based on information collected through an earlier project carried out by ACAHS and RIRDC.

These publications present a range of facts and figures associated with injury, death and wellbeing in different sectors of the farming community (including specific industries, demographic groups, or risks (e.g. ATVs). For example, the vehicle injury publication provides information on the situations and demographic groups for which injury is most likely to occur, and the mental health publication includes information on key pressures on rural farmers that contribute to mental health issues.

Outcomes

The findings of the survey provide new information on the perceptions and behaviours of farmers with respect to farm health and safety. This information if used by work safety authorities, industry, Farmsafe Australia and health practitioners should help them to evaluate their existing approaches (such as legislation, communication strategies, priorities, further research) and make changes to improve such approaches. In the past, the development of many of the approaches has been based on hypotheses, rather than the type of data that will now be available due to this survey. Some key examples of recommendations made as part of the survey analysis that may be used to improve farm health and safety include:

- Differences in attitudes between younger and older farmers towards farm safety may require different approaches to targeting these two groups, especially given how these attitudes do not necessarily translate to adoption of safety practices.

- Women have a more positive attitude towards farm safety than men, which might make them appropriate targets for delivering practical approaches, systems and management, as they are already committed to farm safety.
- The strong Quality Assurance systems requirements within the horticulture and cotton industries have possibly contributed to the strong performance of these enterprises with respect to safety management systems. The cotton industry's Best Management Practice (BMP) manual approach is something that could be considered by other industries.
- The findings relating to cattle enterprise indicate a more targeted approach that demonstrates that improvements to safety systems are not complicated, expensive or time consuming and may result in significant improvements.
- Further research is required into barriers to adoption and drivers for change for specific groups and for specific risks or hazards. The survey demonstrated that there can be a disconnect between attitudes and beliefs, and actual practice change. Examining the disconnect and how to overcome it would be a valuable research area.
- Being able to demonstrate that changes to safety systems can be made in a cost and time efficient manner is important to ensuring adoption. It was recommended that promoting changes made by actual farmers may be more successful than focusing on recommendations from research or work safety authorities.
- The study found that in the past the use of government incentives in the form of subsidies or rebates had been successful in ensuring adoption of changes requiring machinery upgrades etc, and that a review of major hazards that may be successfully eliminated through such incentives be undertaken.
- Regulation and legislation are also successful drivers of improvement, and therefore a review of such legislations should be a priority task.
- An understanding and detailed analysis of the potential efficiency, production and financial gains that can be achieved through farm safety changes should be undertaken as such information can be used in future promotion campaigns.

As the survey report has not been published, the results have not been widely distributed or used by those outside of the ACAHS and Farmsafe Australia. However, these two groups have made extensive use of the survey results in setting their research and program priorities. The survey results are also used in all of their relevant research projects. For example, a study of small-scale famers has just been carried out, and the data from the original survey informed the development of this project. In addition, the survey results have been used for benchmarking with respect to a wide number of other safety audits and training programs.

To date, there has been no additional phase or expansion of the survey carried out. However, a recent study carried out by the ACAHS for RIRDC and ABARES used the same set of questions as part of the basis for a survey of 700 properties Australia wide in order to establish a health and safety baseline for Australian farms

The series of 'chartbook' publications from this project were targeted at a range of individuals and agencies who:

- work to reduce risk associated with elderly farmers
- work to reduce risk associated with young workers on farms
- work to reduce high rates of serious injury and death
- deliver programs that aim to influence the mental health and wellbeing of the farming population

The publications were targeted particularly at educators and developers of public and industry policy interested in improving farm safety.

In January 2011 ACAHS produced a report on the impact of the Centre's work impact titled "From Research to Safe Practice on Farms". This publication provides information on where the outputs and

products produced by ACAHS have been used to inform policy and practices. The following information extracted from that report provides examples of uses of some of the particular publications produced as part of the funding provided by PRJ000541:

- The data in the report on traumatic deaths was used in the development of the Farmsafe Australia Communication Framework and Strategy 2008-2010 and also to develop strategic approaches to farm vehicle safety.
- 'The Facts' series of books have been downloaded from the Farmsafe Australia website at a rate of 200 to 300 per month. Those downloading the reports include educators, contractors, policy makers and public health units.
- Data from 'The Facts' series of books has guided the development of Farmsafe Australia sponsored national strategies to address safety associated with each topic.
- The 'Managing Sugarcane Production Safety' guidelines were endorsed by the Sugarcane industry and made accessible to industry members through the Farmsafe Australia website.
- 'The Facts' report on vehicle injuries was part of a proposal to develop a national farm vehicle safety strategy. Funding was received from the NRMA for the ACAHS to develop a guideline/fact sheet on the need to use vehicle restraints while driving/riding in vehicles on farms.
- 'The Facts' report on the safety of young people in Australian agriculture contributed to the development of an entry level rural worker induction employee guide and discussion guide. It is expected that the adoption of the worker induction material will be Australia wide and partnerships are being formed with Youth Safe Australia, the College of Road Safety and NRMA to promote and deliver the material.
- 'The Facts' reports on young people and traumatic deaths were used by the ACAHS to assist the Commonwealth Department of Immigration and Citizenship in its review of the Temporary Business (long stay), sub class 457 visa. The role of the ACAHS was specifically to provide advice on qualifications, skill and experience necessary to satisfy visa requirements. The ACAHS was said to be "instrumental in the development of changes to the Subclass 457 policy for OHS standards".
- Information in 'The Facts' report on older farmers was used in the development of a publication titled "The great ideas bank – making farm work easier as we get older". This publication is being rolled out through community agencies such as Rotary, and through industry groups including the Macadamia Industry at their 2008 annual conference.

Benefits

The major potential benefit from the investment (in both the survey and the chartbooks) relates to improving the policies, products and information aimed at encouraging adoption of best practice farm safety. The outputs from the project have, or potentially will, contribute to improving these policies and products, and improving adoption rates of safe practices, by collecting and collating more detailed information on the existing barriers to adoption, as well as the existing risk factors associated with particular activities and demographic groups. This in turn should lead to increased adoption of safe farm practices, and subsequent reductions in rates of injury and death on farms. Even if the survey is not extended to become a longitudinal survey over time, the baseline data established through the first phase of the survey in this project will still provide valuable information to achieve such a benefit.

The ACAHS reported in January 2011 that the National Farm Injury Data Centre indicates a significant reduction in the number of farm deaths during the life of the ACAHS. In the 1989-92 period there was an average of 146 deaths per years, while in the period 2003-06 there were only 82 deaths per year (a reduction of 44%). More recent national data is not available. When measured in terms of deaths per 10,000 farms or per 100,000 employees, the reduction has been 35% and 54% in the respective death rates over this period. It is recognised that these statistics refer to the period prior to the funding of the project being analysed here.

It is difficult to make a specific causal link between any use of the chartbooks and survey data, and any reduction in the farm deaths and injuries. This is because there are such a wide range of factors that

influence safety practices on farms. There are a large number of organisations and individuals involved in developing farm safety policies, determining best practices, developing communication and extension materials, and delivering that information to farmers and farm workers. In addition, as the results of the survey have shown, there are many factors that influence a farmer's decision making with respect to farm safety, and these factors vary greatly between individuals.

Another complication in establishing any benefit from such research investments is the time delays evident in the reporting of analysed summary statistics that provide evidence of reductions in farm death and injury rates for particular industries, particular at-risk groups, or particular high risk behaviours.

Regardless of these factors, it is reasonable to assume, given the evidence, that the development and promotion of best practices for farm safety on farms has been improved by the contribution of the knowledge and publications produced by this project. There are likely to have been, or be in the future, some reduction in the likelihood of injury and death on farms as a result of this contribution.

The project also may have lead to some efficiencies in resource use associated with the development and promotion of farm safety practices by a range of organisations. The data analysis and identification of high risk areas will contribute to efficiencies for policy makers in identifying high risk activities and demographic groups for targeting with policies and promotional efforts. In addition, the results of the survey regarding key barriers and motivators for change will also assist in more efficiently targeting appropriate policy and promotion efforts.

It is recognised that there may be some additional costs and time involved for farmers adopting changed safety practices as recommended. However, it is assumed that any such costs will be less than the benefits of a reduced probability of death and/or injury. In some cases, it has been found that the adoption of safe practices can actually lead to improved productivity on the farm. The benefits from the reduced probability of death and/or injury include not only the health and wellbeing benefits to individuals, but also more direct financial benefits in terms of reduced down time and days off work due to injuries, and subsequent financial benefits to employers.

Summary of Benefits

A summary of the principal types of benefits associated with the outcomes of the investment in the project is shown in Table 3.

Table 3: Categories of Benefits from the Investment

Levy Paying Industry	Spillovers		
	Other Industries	Public	Foreign
Economic benefits			
Reduced healthcare costs due to reduced likelihood of death and injury on farms. Efficiencies in use of resources to develop and promote farm safety practices. Reduced loss of income and productivity to employees and employers from lost time due to injury and/or death.		Reduced healthcare costs due to reduced likelihood of death and injury on farms. Efficiencies in use of resources to develop and promote farm safety practices.	
Environmental benefits			
Social benefits			
Reduced death and injury for those on farms.		Reduced death and injury for those on farms.	

Public versus Private Benefits

The benefits from this research will be both public and private in nature, in that they will accrue to both members of the public, and those who are part of the agricultural industries, who avoid being injured on farms with subsequent reduced business and downtime costs. In addition, there will be reduced healthcare costs that will accrue to both the public and the family of the individual who avoids injury.

Distribution of Benefits

The benefits will accrue to the public and to individuals on farms. There are no direct supply chain costs or benefits.

Benefits to Other Primary Industries

The research will result in benefits to a wide ranging number of agricultural industries including grazing, cropping and horticulture enterprises.

Match with National Priorities

The Australian Government's National and Rural R&D Priorities are reproduced in Table 4.

Table 4: National and Rural R&D Research Priorities 2007-08

Australian Government	
National Research Priorities	**Rural Research Priorities**
1. An environmentally sustainable Australia 2. Promoting and maintaining good health 3. Frontier technologies for building and transforming Australian industries 4. Safeguarding Australia	1. Productivity and adding value 2. Supply chain and markets 3. Natural resource management 4. Climate variability and climate change 5. Biosecurity *Supporting the priorities:* 1. Innovation skills 2. Technology

The project investment will contribute toNational Research Priority 2. It does not contribute directly to any of the rural research priorities, as health and safety is not included in the priorities. There is however an indirect link to Rural Research Priority 1.

Quantification of Benefits

Benefits Valued

The benefits from this project are valued through estimating the value of a potential reduction in the likelihood of death or injury on farm, as a result of improved policy, practices and promotion derived from the contribution of the information and publications produced. As noted above, it is difficult to make any causal link between the project's outputs and any reduction in likelihood of death or injury. In addition, given data limitations, it is difficult to draw any conclusions regarding whether there has been any reductions in likelihood of death or injury on farms. Therefore, the approach taken here is indicative only of the potential scale of benefits, given certain assumptions regarding the impact that it could reasonably be assumed this project has had.

A PhD thesis by Pollock (2010) estimated the economic impact of farm-related fatalities on Australian farms. The thesis took a human capital approach to estimating the direct and indirect costs of fatalities. The study concluded that the total economic cost of farm-related fatalities over the period 2001-2004 was estimated to be $650.6 million (in 2008 dollars). This equated to an average cost of $1.6 million per individual fatality (there were 404 farm-related fatalities over the period). The average economic cost per annum over the four years was $162.6 million (650.6/4). The five most common agents causing death accounted for half of the total fatalities and 46.7% of the economic cost ($303.5 million). The five most common agents causing death (in order) were tractors, ATVs, drowning, utilities and 2-wheel motorcycles. The economic impact calculated by Pollock includes:

- the expected future earning capacity (including wages, benefits and household contribution values) of the individual fatality victims (based on average life expectancy and lifetime earnings data for individuals of their age, gender etc);

- the direct costs relating to ambulance, police, hospital, premature funeral, coronial and work safe authority investigation and death compensation costs; and
- an allowance for 'friction costs' which is the loss in output from remaining workers, and training and recruitment costs for the employer over a period of time.

It is assumed that due to use of the outputs from this research project, there will be some increase in the effectiveness of farm safety policies, publications and promotional efforts. This will in turn lead to increased uptake of safe practices, and a subsequent reduction in the likelihood of injury and/or death on farms. During the period from 2001 to 2004, there were 404 fatalities on farms (average of 101 per annum). Over the period 2003 to 2006, the average number of fatalities on farms was 82 deaths per year. More recent statistics are not available, however for the purposes of this analysis it is assumed that the average number of deaths per annum on farms at the time this project was completed (2008) was 90 deaths per annum. If it is assumed there are approximately 330,000 persons employed in agriculture, this equates to a very small probability of death of 0.00027 per annum. It is noted however that a proportion of those having fatal accidents are not workers, but are children or visitors to the farm.

It is assumed that the outputs of this project will influence the development of policy and therefore the safety practices of farmers over the period 2009 to 2019. A number of the publications (chartbooks) were released in 2007 and 2008, and the survey data was made available over the period 2008 to 2010. It is assumed that due to these efforts, the number of fatalities on farms might reduce from 90 deaths per annum to 85 deaths per annum over the 10 years (a reduction of one death every two years). This equates to a reduction in the probability of death from 0.00027 to 0.00026 per annum over the ten years. It is recognised that in reality, the number of deaths on farms, and the probability of death on farms will fluctuate from year to year due to a range of factors. The assumed decrease in probability over the 10 years due to the influence of this project is indicative of the scale of benefits likely to be captured. The assumptions should not be interpreted as a prediction of the actual likelihood of death over this period. The relatively long time scale until maximum benefits are reached is due to the long time-frames that are likely to be evident in policy makers and others utilising the outputs of this project, and then subsequent impact in terms of adoption of changed practices on farms. It is further assumed that after the maximum benefit is reached, the influence of the projects outputs declines over the following five years, before declining to zero impact in 2021/22

The reduction in the probability of death is assumed to flow from both the survey and the creation of the chartbooks. It is assumed that 25% of the assumed benefit is attributable to the use of the survey results, and that 75% is attributable to the use of the chartbooks. For the survey, the assumed benefits relate only to this baseline survey, and are not dependent on future surveys being carried out on the same population as planned. Benefits from such subsequent surveys will be in addition to the benefits assumed here.

It is recognised that for the project to achieve the benefits from the baseline survey, additional resources will be invested by those utilising the survey results (e.g. policy makers, extension officers). Therefore only 10% of the benefit from the use of the survey is assumed attributable to this project.

With respect to the chartbooks, allowance needs to be made to the investment that has gone into collecting the information presented in the chartbooks, much of which was funded outside of this project. In addition, as with the survey, there will be additional resources that will go into developing the policies and practices that will utilise the information from the survey and the chartbooks. For these two reasons, only 5% of the benefit from the use of chartbooks is assumed attributable to this project.

The Counterfactual Situation (Without the Investment)

Without this investment, it is likely that the ACAHS and other responsible bodies would have continued to develop policies, products and promotional activities aimed at encouraging improved safety on farms, and there would have been some decrease in the probability of death or injury based on these activities and policies. However, that decrease in probability may not have been as significant, due to the decisions being based on a less strategic or targeted approach to understanding the risks and barriers to adoption within different industries and demographic groups.

Summary of Assumptions

A summary of the key assumptions made is shown in Table 5.

Table 5: Summary of Assumptions

Variable	Assumption	Source
Probability of death due to a farm accident without project	0.00027	Calculated based on 90 deaths per annum, out of a total workforce of 330,000 people
Probability of death due to a farm accident with project	0.00026	Calculated based on 85 deaths per annum, out of a total workforce of 330,000 people
First year of decline in probability due to project	2009	Year of the majority of outputs from project
Number of years until maximum reduction in assumed probability is reached	10 years, and the benefits decline to zero after five years	Agtrans assumption
Average value of one life	$1.6 million	From Pollock, 2010 (2008 dollar terms; is a present value calculated using a discount rate of 3%)
Attribution of total benefit to survey component	25%	Agtrans assumption
Attribution of total benefit to chartbook component	75%	Agtrans assumption
Attribution of benefits from survey to PRJ000541	10%	Agtrans assumption
Attribution of benefits from chartbook to PRJ000541	5%	Agtrans assumption

Results

Overall Return on Investment

All past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to the first year of investment using a discount rate of 5%. The base run used the best estimates of each variable, notwithstanding a high level of uncertainty for many of the estimates. All analyses ran for 40 years including the first year of investment. Investment criteria were estimated for both total investment and for the Program investment alone. The investment criteria are reported in Table 6. It should be noted that the investment criteria may be an underestimate of total benefits, as fatalities only have been accounted for with non-fatal injuries excluded.

Table 6: Investment Criteria for Total Investment and Program Investment

(discount rate 5%)

Criterion	Program Investment only	Total Investment
Present value of benefits ($m)	1.08	2.29
Present value of costs ($m)	0.26	0.56
Net present value ($m)	0.82	1.73
Benefit cost ratio	4.09	4.07
Internal rate of return (%)	24.1	23.9

Sensitivity Analyses

Sensitivity analyses were carried out on several variables and results are reported in Tables 7and 8. The sensitivity analyses were performed on the total investment only using a 5% discount rate (with the exception of Table 7) with benefits taken over the 40 year period. All other parameters were held at their base values.

Table 7 shows that the investment criteria are not very sensitive to the discount rate. This is partly due to the short time period of benefits assumed (benefits curtailed after fifteen years).

Table 7: Sensitivity to Discount Rate

(Total Investment, 40 years)

Criterion	Discount Rate		
	0%	5% (Base)	10%
Present value of benefits ($m)	3.75	2.29	1.46
Present value of costs ($m)	0.58	0.56	0.55
Net present value ($m)	3.17	1.73	0.92
Benefit cost ratio	6.48	4.07	2.67

Table 8 shows the sensitivity of the investment criteria to the assumption of the number of deaths that is likely to be avoided due to the project. The base assumption was 5 deaths avoided over 10 years. The number of deaths that would have to avoided over 10 years for the investment to break-even at a 5% discount rate is 1.2 deaths

Table 8: Sensitivity to AssumptionsRegarding Number of Deaths Avoided

(Total Investment, 5% discount rate; 40 years)

Criterion	Number of Deaths Avoided Over 10 Years		
	2	5	10
Present value of benefits ($m)	0.92	2.29	4.58
Present value of costs ($m)	0.56	0.56	0.56
Net present value ($m)	0.35	1.73	4.02
Benefit cost ratio	1.63	4.07	8.14
Internal rate of return (%)	10.8	23.9	36.3

Confidence Rating

The results produced are highly dependent on the assumptions made in each analysis, many of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes

A confidence rating based on these two factors has been given to the results of the investment analysis (Table 9). The rating categories used are High, Medium and Low, where:

High: denotes a good coverage of benefits or reasonable confidence in the assumptions made

Medium: denotes only a reasonable coverage of benefits or some significant uncertainties in assumptions made

Low: denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 9: Confidence in Analysis

Coverage of Benefits	Confidence in Assumptions
Medium	Low

Conclusions

The investment in this project has resulted in a number of outputs including a baseline industry farm safety survey in NSW, and a series of 'chartbook' publications on high priority issues regarding health and safety in agriculture. These outputs have been, and will continue to be, used to influence a wide range of policy, research and communication applications, and there is some evidence of that use to date. As with a lot of research related to health and safety, it is difficult to determine with confidence a causal relationship between the outputs of this research, and any subsequent reduction in the likelihood of death or injury on farm. However, an attempt has been made here to place a value of on the potential impact of the research outputs.

The benefits of the research were valued assuming a contribution to a decreased probability of death on farms in the future. The analysis found that for the investment of $0.56 million (present value terms) there was a return of $2.3 million when considering benefits over 40 years (present value using a 5% discount rate). This resulted in a benefit-cost ratio of 4.1 to 1.

Acknowledgments

Tony Lower, Australian Centre for Agricultural Health and Safety
John Temperley, Australian Centre for Agricultural Health and Safety

References

Pollock, K.S. (2010) "The economic cost of farm-related fatalities and the perceptions and management of health and safety on Australian farms" Thesis submitted for the degree of Doctor of Philosophy to Sydney Medical School, University of Sydney, March 2010.

Annex 1: Results for CRRDC Process

As for the results presented earlier, all past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to the year of analysis (2010/11) using a discount rate of 5%. These results are shown in Table A.1 and A.2 and reported for different periods of benefits with year 0 being the last year of investment. Benefits ran for a maximum period of 30 years from year 0. Investment criteria were estimated for both total investment and for the Program investment alone.

Table A.1: Investment Criteria for Total Investment and Total Benefits
(discount rate 5%)

	0 years	5 years	10 years	15 years	20 years	25 years	30 years
Present value of benefits ($m)	0.00	0.60	1.87	2.41	2.41	2.41	2.41
Present value of costs ($m)	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Net present value ($m)	-0.59	0.01	1.28	1.81	1.81	1.81	1.81
Benefit cost ratio	-	1.01	3.17	4.07	4.07	4.07	4.07
Internal rate of return (%)	neg	5.3	22.1	23.7	23.7	23.7	23.7

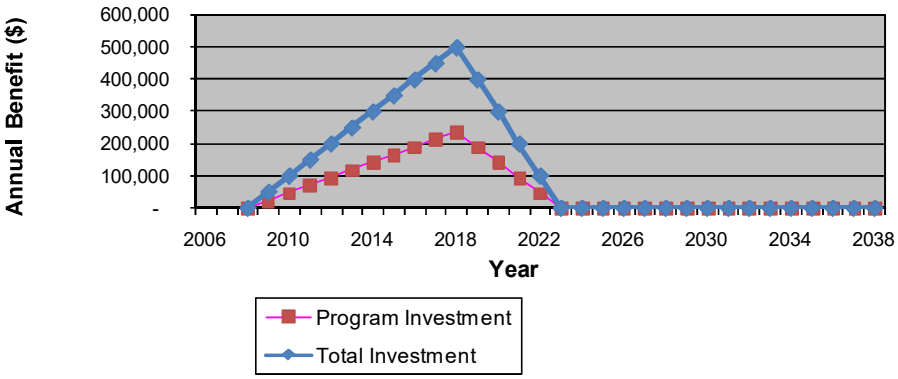
Table A.2: Investment Criteria for Program Investment and Program Benefits

(includes both RIRDC and industry contributions; discount rate 5%)

	0 years	5 years	10 years	15 years	20 years	25 years	30 years
Present value of benefits ($m)	0.00	0.28	0.88	1.13	1.13	1.13	1.13
Present value of costs ($m)	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Net present value ($m)	-0.28	0.004	0.61	0.86	0.86	0.86	0.86
Benefit cost ratio	-	1.02	3.18	4.09	4.09	4.09	4.09
Internal rate of return (%)	neg	5.3	22.3	24.1	24.1	24.1	24.1

The flow of annual benefits is shown in Figure A.1 for both the total investment and for the Program investment.

Figure A.1: Annual Benefits



Economic Evaluation of Investment in the Farming & Fishing Health & Safety R&D Program

by Peter Chudleigh, Sarah Simpson and Jessica Lai

Publication No. 11/170

This report presents the results of economic analyses of three investments within the Farming & Fishing Health & Safety Program.

The information contained in the report is targeted at Program and RIRDC management, those within the industries that support the Program, and the wider community. Another target audience is the Australian Government and Council of Rural Research and Development Corporations (CRRDC).

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