



Te Kaporeihana Āwhina Hunga Whara

Farmers' mental health: A review of the literature

Report prepared for the Farmers' Mental Wellbeing Stakeholder Group by the
Accident Compensation Corporation



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Executive Summary

More than any other developed country, New Zealand's economy, people and environment depend on the success of land-based industries. The agriculture industry is at the core of New Zealand's economy and is a major determinant of employment and social wellbeing.¹ Rural communities and in particular farmers and their families, are at the heart of this industry. Maintaining their health and wellbeing (including their mental health) will help farmers and their families cope during difficult times.

The purpose of this report is to provide the Farmers' Mental Wellbeing Stakeholder Group and the ACC Workplace Injury Prevention Team with a literature review that will build on and inform their knowledge and work in this area. The literature identified through the review is grouped into two sections:

- Part 1 looks at farmers' mental health including risk and protective factors, barriers to accessing support, and enablers to reducing stress
- Part 2 focuses on prevention and early intervention and provides a summary of the many strategies and programmes aimed at improving farmers' mental health. This section also covers warning signs and symptoms, coping strategies, and how to help those in need.

Key findings and themes

The prevalence of farmer suicide and mental illness featured in the literature with much discussion about the wide range of associated risk factors. While many prevention and early intervention strategies and programmes were identified, only a small number had been evaluated.

Farmer suicide - The review found evidence to suggest that:

- the high rate of farmer suicide (compared to the general population) is an **international problem** spanning several countries
- farmer suicide appears to be higher than other occupations in countries where events such as **disease and drought have occurred**
- Influencing factors for suicide include uncontrollable **events, mental illness** and **seasons** relating to peak work periods and mental illness
- some farmers had ended their life even though they had accessed services and it was noted that the services provided may not have been appropriate.

Farmer mental illness -

- there were **mixed findings** in the literature regarding the prevalence of mental illness among farmers - some authors found no conclusive data while others found an increased prevalence in English, Welsh and Norwegian farmers compared to non-farmers
- risk factors ranged from those **beyond farmers' control** such as weather, disease, and government regulations, to those more **within their control** such as managing workloads, finances and their physical health
- two key concepts emerged from the literature:
 - a **causal pathway** of multiple risk factors leading to mental illness
 - a **continuum** of risk factors from global uncontrollable factors to more controllable factors at the farm and farmer levels

- farmers were found to have **lower rates of accessing** mental health services compared to other occupational groups, with symptoms possibly going unnoticed by health professionals
- mental health services alone are unable to address all of the factors and a **collaborative approach** is needed.

Barriers and enablers -

- barriers included a lack of **confidence** in services and/or being worried about **confidentiality**
- enablers included controlling events than can later cause stress by **planning** ahead and promoting **positive attitudes** by setting realistic goals and shifting from worrying to problem solving.

Prevention and early intervention -

- a wide range of **strategies and programmes** were identified and some had been evaluated
- a key theme was the use of a **multi agency – multi strategy approach**
- other key themes were **warning signs** and symptoms, **coping** strategies, and **how to help** those in need.

Future work

Further work is needed to:

- investigate the impact of farmer suicide on families and communities
- examine the links between events beyond farmers' control, mental illness and suicide
- conduct a systematic review of prevention and early intervention initiatives.

By understanding the links, agencies may be able to plan ahead and be better prepared for when disasters strike. Additional resources and services could be quickly made available to help farmers and their families get through. These services could be delivered in tandem with other wider government and industry initiatives aimed at supporting farmers in times of crisis.

A systematic review will help to better understand which strategies and programmes are the most effective regarding:

- improving the mental health of farmers and their families
- preventing the onset of mental health problems
- intervening early when the signs of mental illness become apparent
- which resources are the most useful for farmers and their families.

It is anticipated this review will support the further development of the Farmers' Mental Wellbeing Stakeholder Group's draft 'Farmer Mental Wellness Strategy and Action Plan' and inform future programmes and initiatives.

1. Introduction

Over the last twenty years or more there has been a growing awareness regarding the mental health of farmers both in New Zealand and internationally. Global, national, regional, community and local factors play a critical role in influencing farmers' mental health, either negatively or positively. Events such as long-term drought and disease can lead to an increase in the rates of suicide and depression. These types of events and their impacts have elevated the issue among rural communities highlighting the need to increase efforts to improve and maintain farmers' mental health.

1.1 Why is farmers' mental illness a problem?

Each year in New Zealand over twenty farmers (male and female) take their own lives.² Farmers' mental illness and suicide results in immeasurable social, psychological and economic costs to families and rural communities who experience a serious injury and or a fatality while farming.³ Mental illness among farmers is likely to increase the risk of injury, accidental death and suicide.⁴

1.2 Why does ACC have an interest in farmers' mental health?

ACC covers accidental injuries and provides entitlements. In some circumstances this includes mental injury (mental illness), for example a mental injury that may occur subsequent to a physical injury for which the client has cover.

ACC also has a role to play in injury prevention, and minimising the risk of injury or death among farmers and is interested in:

- reducing farming injuries
- developing and implementing injury prevention initiatives to reduce the number of farming injuries
- collaborating with other agencies to address the influencing factors (risk and protective factors) that lead to mental illness, injury and suicide.

2. Purpose

The purpose of this report is to provide the Farmers' Mental Wellbeing Stakeholder Group and the ACC Workplace Injury Prevention Team with a literature review that will build on and inform their knowledge and work in this area.

The report was requested by the Farmers' Mental Wellbeing Stakeholder Group and commissioned by the ACC Workplace Injury Prevention Team. The ACC Policy Team completed this work with the support of the Research Team. It is anticipated the report will help to inform the:

- draft 'Farmer Mental Wellness Strategy and Action Plan'
- ACC Agriculture Repeat Claims information gathering project and the interviewers who will be interviewing farmers.

Specifically, the brief asked the following research questions:

- *What literature is available on farmers' mental wellbeing in New Zealand and internationally?*
- *What are the risk and protective factors?*
- *What programmes and resources are available?*
- *What programmes and resources are the most effective?*

The report presents findings from the literature in response to these questions. Time did not permit assessment of the many strategies and programmes to determine their effectiveness. However, evaluation findings of some specific strategies that appear promising are provided.

3. Methods

This literature search was limited by the timeframe required to search and review the relevant literature. Literature was gathered in three ways:

- a data base search performed by ACC Research
- based on papers identified through the above search, references in the papers which strongly related to the topic were searched via the internet and some data bases accessible by ACC
- papers and reference lists provided by key stakeholders of which the most relevant were included.

Further information regarding the search can be found in Appendix 1. A thematic analysis of the literature was conducted and the themes identified provide the basis for the report.

4. Results

A total of 64 papers were identified falling across two broad themes. Around half of the papers focused on farmers' mental health while the other half examined prevention and early intervention. Some papers overlapped both groups.

Part 1: Farmers' mental health

Farmers' mental health

- Suicide
- Mental health problems and mental illness

Influencing factors

- Risk factors
- Protective factors
- The combined affects of multiple factors
- The flow-on affects of farmers' mental illness

Barriers to accessing support

Enablers to reducing stress

Part 2: Prevention and early intervention

Prevention and early intervention

- Strategies and programmes
- Use of a multi strategy – multi agency approach

Warning signs and symptoms

Coping strategies

How to help those in need

More attention was devoted to Part 2 on prevention and early intervention in response to the Farmers' Mental Wellbeing Stakeholder Group's request.

PART 1: Farmers' mental health

1. Farmers' mental health

Higher rates of suicide among farmers were identified across several countries particularly in those suffering a crisis affecting farmers such as disease outbreak in the UK and drought in Australia. This suggests a link between times of crisis for farmers and increased levels of stress, anxiety, mental health problems and suicide rates. This indicates that during times of crisis, farmers need additional support given their vulnerabilities.

Conflicting findings were identified regarding the prevalence of mental health problems and mental illness among farmers. While some authors stated there was no conclusive data to indicate there were higher rates of mental health problems compared to the non-farming community, other authors found English, Welsh and Norwegian farmers had an increased prevalence of psychological morbidity and depression compared to non-farmers. Further evidence suggested farming is a very stressful occupation, with farmers experiencing higher levels of stress compared to other occupations.

1.1 Suicide

The high rate of farmer suicide (as compared to the general population) has been found to be an international problem spanning several countries.⁵ In 2014 it was reported that in the United States farmers are twice as likely as the general population to commit suicide. In France a farmer dies by suicide every two days. In the UK the farmer suicide rate increased by 10 times during the 2001 outbreak of foot-and-mouth disease, and in Australia higher rates have been reported following severe drought.⁶ Farmers have also been found to have lower rates of accessing mental health services compared to other occupational groups, with symptoms possibly going unnoticed by health professionals.⁷

Farmer suicide in the UK

In the UK it was found that farmers had the largest number of suicides compared to any other occupational group and they were two and a half times more likely to think life was not worth living than non-farmers.^{8,9} From a sample of 60 participants, a number of English and Welsh farmers reported they had come into contact with, or had been good friends with farmers who had committed suicide.¹⁰

Farmer suicide in Australia

In Australia both agricultural labourers and farmers/farm managers were identified as having higher suicide rates than those in other occupational groups.¹¹ From 1988 to 1997 suicide rates among male farmers and farm managers was more than double the rate of the non-farming Australian male population and this was coupled with low reporting of mental health disorders among farmers.¹² This was supported by evidence from South Australia where it was found that the suicide rate of farmers was 67% higher than in rural populations, which in turn was higher than in urban South Australia.¹³ It was noted that the Australian rates could be higher than reported due to data limitations that had the effect of the under-reporting of suicide deaths and over-counting of accidental deaths.¹¹

Farmer suicide in New Zealand

In New Zealand the evidence has been mixed and appears to be affected in part by data limitations and the absence of a specific occupational classification for farmers. Farmers are grouped with other occupations, making it difficult to research their rates of suicide. The review, however, identified that between 2001 and 2005 those working in farming, fisheries, forestry and trades had higher suicide rates than other occupations.¹⁴ Elsewhere it was reported that farmers were not at high risk of suicide yet farmers,

hunters and cullers were more than twice as likely to use firearms to commit suicide as compared to other occupational groups.¹⁵ These findings support similar evidence from the UK regarding the use of firearms among farmers to commit suicide.

Further to these findings, it was reported that 24 suicides associated with dairy farming occurred between 2007 and 2011 with attempted rates potentially 20 to 30 times greater than completed suicide rates.¹⁶ It was found that suicides in the dairy sector appeared to have two peak periods, spring and autumn reflecting work stress and possibly climatic and financial issues around these times.¹⁶

1.2 Mental health problems and mental illness

Several themes emerged from the literature regarding farmers' mental health problems and mental illness:

- mental illness is a significant risk factor for suicide among farmers
- the prevalence of mental health problems and mental illness
- high levels of stress

Mental illness appears to be a significant risk factor for suicide among farmers

A study of 84 English and Welsh farmers who died by suicide showed that the most common single factor of suicide was the presence of mental health problems especially depression which was found in 82% of farmer suicides.¹⁷ Other common factors identified in the study included work, relationship, financial problems and physical illness.

The prevalence of mental health problems and mental illness

In New Zealand, male and female dairy farmers were interviewed between 2013 and 2014 at Health PitStops offered at dairy events across New Zealand. The interviews were part of a four year (2010 – 2014) initiative known as the Dairy Farmer Wellness and Wellbeing Programme.¹⁸ They found that the prevalence of depression among dairy farmers was slightly lower than national data, while the prevalence of a mood or anxiety disorder was higher. Twenty per cent of respondents were identified with unacceptable scores associated with depression and/or anxiety and were subsequently followed-up. They also found that over the four years of conducting the survey there appeared to be an improvement in the prevalence of emotional wellbeing but the authors did not provide reasoning for why this may have occurred.

Internationally, English, Welsh and Norwegian farmers were found to have an increased prevalence of psychological morbidity, depression and levels of anxiety than non-farmers.^{19,20} Conflicting findings by Fraser et al. found there was no conclusive data to indicate if farmers and farming families experienced higher rates of mental health problems compared to the non-farming community. However, farming did appear to be associated with a unique set of characteristics and stressors.⁵ These related to the physical environment, the structure of farming families, economic difficulties and uncertainties making farming potentially hazardous to mental health.

High levels of stress

Farming has been listed as one of the ten most stressful occupations in the world and researchers from Europe, USA and Australia found that farmers experiencing a high demand work environment coupled with low control and low social support can develop stress and strain, mental health problems, and depression.²¹ South Australian dairy farmers and New Zealand orchardists, sharemilkers and salaried farmers were found to have higher levels of stress compared to other occupations and a correlation between high work hours and high levels of stress was identified among the South Australian dairy farmers.^{22,23}

2. Influencing factors

2.1 Risk factors

A vast range of risk factors were identified with many common themes emerging across countries. Of interest was the distinction between those events that are within the control of farmers and those beyond their control. The risk factors can be grouped along this continuum ranging from global factors to individual farmers factors. Using this continuum, the risk factors identified through the literature review have been grouped in this way. These are discussed below and summarised in table 1.

Global/national factors

Factors at global and national levels are often out of farmers' control and include factors such as climate change, commodity markets, high interest rates, and the decline in rural infrastructure and subsequent opportunities for social connection.^{5,21} A global trend mentioned in the literature was a shift towards fewer dairy farms with larger herd sizes resulting in greater financial responsibilities and the adoption of new technologies.²¹

Regional/community factors

Unpredictable events occurring at regional and community levels include weather and extreme and unpredictable climatic patterns such as floods or prolonged drought. Seasonal conditions, weather dependency and threats to stock and crops due to disasters, disease or pests were common themes in the literature. The decline in rural infrastructure leading to increased isolation was identified as a factor at regional and community levels including increased scrutiny around environmental practices and sustainability leading to increased pressure on farmers.^{5,21,24}

Local farm factors

The farm environment presents many hazardous working conditions, dangers and worries including physical, biological, chemical, mechanical hazards and the risk of machinery break-down.^{5,21,24} Mentioned in the literature was the risk of depression, psychological distress and suicide ideation from exposure to pesticides and organophosphates. However there is little evidence to support a causal link to consider it as a risk factor.^{8,25,26,27} Farmers also reported frustration, anxiety, stress, fatigue, depression and negative self image due to noise-induced hearing loss. Consequences of such hearing loss included increased costs associated with accidents, personal injury and machinery damage.^{24,28}

Isolation was another factor identified including geographical, social, and cultural isolation. Self-imposed psychological isolation stemming from stoical attitudes reflecting a strong sense of self-reliance was identified. Lack of social supports and networks also featured which could contribute towards a poor work-life balance.^{8,21}

The changing role of farmers as the farm expanded was also highlighted. As the role of the farmer shifted from self-managing the farm to being an employer, additional responsibilities and skills are required. Increasing farm sizes were associated with higher levels of supervision involving a more diverse workforce including workers for whom English was a second language.²⁹ Finding skilled workers and the increased environmental demands and consumer expectations were also influencing factors at the local farm level.²¹

Family factors

Family concerns such relationship problems was reported as one of the most common factors at the family level. The intergenerational aspects of farming families was mentioned and the difficulties that could occur when there was no communication between generations about the future of the farm.^{9,5,21,30}

Farmer factors

Two of the most commonly identified factors at the farmer level were worrying about finances and work.

Financial worries included irregular and uncertain income and financial debt, the effects of new government regulations and compliance with these, bureaucracy, and the amount of paper work required. Some farmers reported having to take an additional job off the farm to supplement their income rather than sell the farm which was running at a loss.^{9,8,5,21,24,26,27,30,}

Farmers reported worrying about work including high workloads, time pressures, long working hours especially during peak work times such as harvesting or calving, difficulties with understanding new technology and solitary work. The most commonly reported symptoms reported were sleep problems, feeling irritable and down, fatigue, and high rates of stress.^{9,8,21,24}

Physical health problems such as farm-related injuries, chronic physical symptoms, back problems, and respiratory problems were identified as influencing factors including acute and chronic poisoning, and zoonosis (the transmission of disease between animals and humans).^{8,5,26,27,31,}

Mental health problems and mental illness such as stress, anxiety, depression, and psychological distress were identified as risk factors at the individual farmer level.^{8,5,21,27}

Individual personality, gender and community attitudes that limited a person's ability to acknowledge or express mental health problems and seek help for these were identified as significant risk factors for suicide in farmers.^{7,11,21} This theme is expanded upon further under the section – 'Barriers to accessing support'.

In summarising the risk factors, many appear to be shared across countries and cultures. In one study it was found that factors such as poor general health, younger age and alcohol use were not found to significantly predict mental health problems.²⁷ The breadth of risk factors for mental illness and suicide among farmers implies that health alone cannot address them all. It requires collaboration across agencies and other sectors involving medical, social and political strategies across the continuum of risk factors.

Table 1: Farmers' mental health: Influencing factors across a continuum

Out of farmers' control -----				Within farmers' control		
Global	National	Regional	Community	Local Farm	Families	Farmer
Climate change Global economy New Zealand dollar Fewer dairy farms with larger herd sizes Greater financial responsibility New technology	Government laws and regulations Taxes and expenses High interest rates Commodity markets Decline in rural infrastructure and subsequent opportunities for social connection Environmental sustainability Animal welfare Quality and safety of food products	Weather/climate Seasonal conditions Disease outbreaks Pests Decline in rural infrastructure Environmental considerations and sustainability	Weather/climate Lack of skilled labour Lack of access to services Lack of appropriately trained professionals Lack of awareness and knowledge of mental health issues, what it is and how to provide support Stoic attitudes Reinforcement of stereotypes Stigma associated with mental illness Lack of anonymity/confidentiality when accessing services	Weather/climate Seasonal conditions and peak work times Machinery breakdown Hazardous working conditions and dangers such as physical, biological, chemical and mechanical hazards Traditional dairy farming: Isolation and solitary work Long hours None or very few employees Limited opportunities to take leave or a holiday Home and work combined limiting relaxation time away from work Lack of support Industrial dairy farming: Monitoring new systems such as automatic and robotic milking More employees creating a new kind of professional role as an employer including extended supervision of staff, and wider responsibility for Occupational Health and Safety More use of foreign/migrant workers who can experience long work hours, away from family and friends and social isolation caused by linguistic and cultural barriers New skills and knowledge needed such as good leadership Economic - stable farm income/irregular and uncertain income, financial debt Record keeping and paper work	Structure of the family – inter-generational Living on or off the farm Family problems Working with multi-generational family members	Worrying about work Long hours Work load and production performance Transformation from family farmer to entrepreneur Social and environmental responsibility Time pressures and personal efficiency Control of work Understanding new technology Paper work General Financial worries - irregular and uncertain income and financial debt. Having a job off the farm to supplement income Personal health and fitness Hearing problems leading to communication difficulties and social isolation, frustration, anxiety, stress, fatigue and depression Work-life balance Lack of time off work Lack of social support Poor personal attitude and low self-esteem Mental strain causing sleeping and concentration problems, psychosomatic disorders and increased injury rates

2.2 Protective factors

Protective factors identified in the literature included social support, good physical health, preventive behaviours, and being able to get practical help and access appropriate services.

Social support - included protective factors such as being married, having family or having a confidant at home and having close friends.⁸ Farmers also sought support from others working in the agricultural industry, especially veterinary surgeons.³² A study in South Dakota of operators of farms and ranches by Welke found that perceived social support was an important variable in the relationship between agricultural stress and job satisfaction.³³

Good physical health - was identified as a protective factor as well as understanding the link between good physical health and mental wellbeing.⁸

Preventive behaviours - and healthy lifestyle choices as well as frequent leisure activities were identified as protective factors.⁸ The adoption of health maintenance strategies encompassing a range of preventive behaviours and healthy lifestyle choices were reported. These strategies provided a sense of control at a time when factors outside of farmers' control were adversely affecting their health and wellbeing.³⁴

Practical help - like the ability to hire staff to harvest a crop, or being able to get a good price for livestock and produce was suggested as a possible protective factor.³⁵

2.3 The combined affects of multiple factors

The affects of social, geographical and psychological factors relating to work, living and social arrangements were found to impact farmers' health and wellbeing.¹¹ Farmers are subject to complex, intertwined, multiple stressors and it was proposed that the cumulative and changing nature of these stressors was more important than any one life event in regards to farmers' mental health.²⁴ It was also suggested that the content and organisation of work, a worker's competence, their needs, cultural beliefs and practices, and personal issues had an effect on their work performance and satisfaction and that these multiple factors have an influence on farmers' physical and mental health.²¹

2.4 The flow-on affects of farmers' mental illness

Impact on families and communities

It was observed in the literature that the cost of farmers' mental health include costs that impact upon the entire economy including costs to businesses, costs to taxpayers in the form of health and welfare services, costs to families and also those intangible, immeasurable social and psychological costs to individuals, families and communities.²⁴ However, the impacts, particularly the impact of suicide on families and communities has not been substantially investigated.¹¹

Stress and injury

An Iowa Farm and Rural Life Poll showed that farmers experiencing high stress were 1.7 times more likely to have a serious injury than farmers with low to moderate stress. Further to this, it was reported that those farmers with high stress, high work loads and limited social outlets were 3.3 times more likely than other farmers to have a serious injury.³³ Results from the North Dakota Rural Life Poll suggested that younger farmers with high financial worries were more likely to be involved in farm accidents possibly due to decreased safety practices in order to save money.³³

3. Barriers to accessing support

A range of barriers to accessing support were identified through the literature review. These are summarised below.

Knowledge

- lack of knowledge about mental health problems and the ways in which symptoms might be expressed and failure to recognise depression^{17,36}
- failure to recognise depression and not seeing an emotional reaction as a sign of illness, and therefore not seeking personal support through the channels of health or social services^{32,36}
- lack of knowledge about mental health services and support available.³⁶

Attitudes

- pride, independence, self-efficacy⁷
- stoicism toward ill health and/or injury, a tendency to understate an injury or illness^{3,7,}
- fatalism – ‘when your times up, it’s up’ no point worrying about it because it will happen anyway³
- stigma associated with needing and accessing help reinforced by the traditional masculine paradigm of farming and stereotypes^{11,7,36}
- a traditional focus on ‘practical’ problem solving as opposed to ‘seeking help’¹¹
- unwillingness to express emotions³⁶
- being scared about being hospitalised against their will.³⁶

Services

- lack of access (because of both tangible and psychological barriers) to physical and mental health services^{11,36}
- lack of confidence in the help available^{7,36}
- anonymity and confidentiality concerns.³⁶

Other barriers

- being too busy, unrelenting physical work demands^{7,36}
- being too tired at the end of a working day to read about injury and disease or to go onto the internet to learn about it^{3,11}
- financial issues.³⁶

4. Enablers to reducing stress

Very little was found on enablers in the literature. A fact sheet from Ohio State University titled, ‘Recognise and Manage the Stress of Farm Life’ identified the following enablers to help farmers reduce stress:³⁷

Control events that can later cause stress:

- plan ahead – replace work machinery parts during the off season instead of at the last minute
- plan to use time efficiently by setting priorities for tasks to be accomplished
- prior to stressful seasons, such as planting or harvest, determine who will take care of everyday chores
- learn to say no to extra commitments.

Control attitudes that can lead to additional stress in your life:

- set realistic goals and expectations daily
- emphasise what was accomplished, not what failed to be accomplished
- see the big picture: ‘It’s a good thing the tractor quit working in the driveway instead of in the middle of the highway’
- shift from worrying to problem solving.

PART 2: Prevention and early intervention

1. Prevention and early intervention

1.1 Strategies and programmes

Many initiatives including public health campaigns, network building, training, telephone helplines, and the development of resources such as handbooks and fact sheets were identified. These have been categorised and summarised in the table below.

Table 2: Summary of strategies and programmes

Strategies and approaches	Initiatives and programmes
National or state initiatives, public health campaigns	
National strategies/initiatives that provide a framework or overarching focus National, state and local action plans, blueprint Involvement of farmers' peak bodies ³⁸ Establishing 'champions' and lead agencies and involvement of farmers' peak bodies ³⁸ Project officer support ³⁸ Enthusiasm of dedicated individuals ³⁸ Rebate of costs ³⁸ Advocacy for improved regulations ⁴⁰ Education and awareness raising campaigns that are pre-tested with farmers ³⁸	<i>New Zealand:</i> Rising to the Challenge: the Mental Health and Addiction Service Development Plan 2012-2017 ³⁶ Agriculture Sector Action Plan to 2013 ³⁶ The National Depression Initiative and 'Like Minds Like Mine' <i>Australia:</i> NSW Interagency Action Plan for Better Mental Health ³⁹ The NSW Farmers Blueprint for Mental Health and Wellbeing ⁴⁰ Beyondblue' ³⁶
Agency networks	
Professional networks connecting mental health agencies and agricultural agencies together in partnership ⁴¹ Establishing links between agencies and health services as part of local emergency planning ³²	New Zealand rural support networks eg Like Minds Taranaki works closely with Federated Farmers Rural Support Trust and with national organisations to increase awareness and understanding about stress, anxiety and depression ⁴²
Networks, local support groups, care/referral pathways	
Local support groups, self-help groups ⁴⁰ Development of local support networks and utilising mental health specialists to train and provide consultative support to veterinary surgeons, farming organisations and self-help groups ³²	NSW Farmers Mental Health Network and Blueprint ⁴⁰ NSW Farm Link including Mental Health First Aid training to frontline agricultural workers and linking services related to farmers and mental health and establishing pathways of care.
Services	
Improving access to mental health services, including Primary Care detection and treatment ^{40,41} Co-location of mental health services with other services Health professionals being willing to work outside their professional environment Access to Rural Financial Counsellors, Support Workers, welfare services and drug and alcohol programmes and services ⁴⁰ Programmes to increase business, family and personal resilience ⁴⁰	NSW Farmers Mental Health Network and Blueprint ⁴⁰ NY FarmNet - a hotline helping farmers resolve personal and financial difficulties. Staff ask open-ended questions to learn about the farmer's situation and then assigned the case to one of 47 personal and financial consultants throughout New York State, who reach out to farmers within 24 hours. ⁶ Identification of Farm Extension Agents who are often the first point of contact for farmers and provide a resource through which to provide support ⁴¹

Resources	
Appropriate and useful resources ^{38,40} Resource development such as handbooks/checklists, information/fact sheets, and website information Farmer-designed resources and initiatives ³⁸	<i>New Zealand resources</i> - 'Down on the Farm', ⁴³ 'Coping with Stress on the Farm', ⁴⁴ 'Alleviating Stress on Dairy Farms' ³⁶ 'Manage stress to increase farm safety', Safe Farm (Iowa) ⁴⁵ 'Recognise and Manage the Stress of Farm Life' - a fact sheet, (Ohio) ⁴⁶ Farm Stress Line - information sheet (Saskatchewan) ⁴⁷ NSW 'Managing the Pressures of Farming Handbook' ⁴⁸
Training	
Accessible training and education courses ³⁸ Mental health specialists to provide training to veterinary surgeons and introduce the training into their curriculum ³²	Training for Farm Extension Agents using the Mental Health First Aid course ^{49,41} MH101, (New Zealand) ³⁶
Train-the-trainer approach	
Using mental health workers to train others and provide consultative services ³⁸	The NSW Farmers Blueprint for Mental Health and Wellbeing
Settings approach and community development programmes	
Using sports clubs to disseminate information and provide training to increase awareness and understanding Increasing knowledge and awareness and disseminating information and resources at farm expos	NSW Rural Adversity Mental Health Programme ³⁶ 'Good Sports, Good Mental Health' (Australia) ³⁶ Community talks on depression and anxiety as part of a suicide prevention strategy lead by Injury Prevention Waimakariri, a Council initiative in New Zealand ³⁶
Internet based strategies, helplines, text and email support services	
Providing an internet-based national directory of services Providing computerised cognitive-behavioural therapy ³² Establishing telephone help lines offering counselling and referral to support services ³²	Beyondblue Rural Assistance Information Network Map in Australia listing services available in each region ³⁶ Telephone support helplines - NSW Rural Mental health Support Line and Lifeline Australia NY FarmNet – a telephone hotline helping farmers resolve personal and financial difficulties ⁶ NSW Rural Adversity Mental Health Programme ³⁶
Media	
Using media, especially regularly using rural media and systematically disseminating information to raise awareness ^{38,40}	Local radio stations were used by farmers as a key source of information during the outbreak of foot-and-mouth disease in the UK ³²
Research projects/developing the evidence base	
Conducting research projects and initiatives aimed at increasing knowledge, and changing attitudes and behaviours Conducting research projects to increase farm profitability, review work practices and conditions, provide training in new technology and support improved environmental practices ⁵⁰	NSW research projects – the Sustainable Farm Families project; the Sustainable Dairy Farm Families project; and the Farming Fit project ^{51,52,53, 54,55} USA Extension Service assisting in major prevention research projects with an emphasis on rural areas ⁵⁶ 'Health PitStop' clinics at agricultural events around New Zealand ³⁶
Practical help	
Providing practical help to directly assist farmers in times of crisis ⁴⁰ Advocacy for farm support ⁴⁰	Supporting farmers to be able to hire staff to harvest a crop, or to get a decent price for livestock and produce ³⁵

1.2 Use of a multi strategy - multi agency approach

The formation of professional networks and the use of multiple strategies to prevent suicide among farmers and increase mental health was a theme that featured in the literature.⁴⁰ The NSW Farmers Association Mental Health Network sets out a blueprint outlining a series of actions linked to evidence in the 'National Action Plan for Prevention, Promotion and Early Intervention in Mental Health'.⁵⁷ It provides a good example of a multi strategy - multi agency approach. This is discussed further including Mental Health First Aid training which forms a critical element of the strategy for improving networks between rural professionals.

1.3 Mental Health First Aid training

Mental Health First Aid training is a 12 hour course used extensively in every state and territory of Australia. In NSW, the training forms part of the NSW Farmers Association Mental Health Network to improve capacity among farming communities to provide early intervention for mental health problems. In southern Queensland Australia, the training was used to train Farm Extension Agents who are often a first point of contact for farmers.

Evaluations of the training found that it had significantly improved participant's confidence, knowledge and attitudes towards supporting mentally ill people in the community.^{49,41} A further finding showed that while the training was effective in increasing support to front-line agricultural workers in southern Queensland, it also decreased participant's stress and supported the development of professional networks between mental health services and agricultural service sectors.⁴¹

1.4 NSW Farmers Blueprint for Mental Health and Wellbeing

In response to a major drought in NSW, key agencies were invited to participate in a long-term collaborative program aimed at improving the mental health and wellbeing of people on farms. These agencies became the NSW Farmers Mental Health Network and were instrumental in developing the 'NSW Farmers Blueprint for Maintaining the Mental Health and Wellbeing of the People of NSW Farms' (the Blueprint).⁴⁰

The Blueprint takes into account the known risk and protective factors and available resources. The activities range from: reducing duplication and confusion over similar services, development of new resources, development of a communication strategy, and a plan for the partnership. The Blueprint and overarching NSW strategy sets out a useful model showing how a multi strategy – multi agency approach can be implemented. While the literature review identified findings from evaluations of the Mental Health First Aid training, it did not identify any findings regarding the effectiveness of the overall strategy in NSW. Further detail about the Blueprint can be found in Appendix 2.

NSW Interagency Action Plan for Better Mental Health

The Blueprint sits within the context of the 'New South Wales Interagency Action Plan for Better Mental Health'³⁹ which is a companion document to the 'NSW Mental Health Plan 2005-2010'. Together they set the strategic direction for mental health in NSW. Better mental health through improved service responsiveness is the aim of the Plan which sets out three strategic directions: prevention and early intervention; community support services; and coordination of emergency responses.

New Zealand strategic context

Several national strategies and plans set the strategic direction for mental health in New Zealand within which a mental wellness strategy for farmers could sit. These include: the 'New Zealand Suicide Prevention Strategy 2006 – 2016',⁵⁸ the 'National Mental Health Information Strategy',⁵⁹ and 'Like Minds, Like Mine National Plan 2014–2019: Programme to Increase Social Inclusion and Reduce Stigma and Discrimination for People with Experience of Mental Illness'.⁶⁰ The issue of farmers' mental health also links with broader workplace injury prevention strategies and farm injury prevention initiatives.

1.5 Research projects from Victoria, Australia

Three research projects from Victoria Australia were identified: the Sustainable Farm Families project,⁵¹ the Sustainable Dairy Farm Families project,⁵² and the Farming Fit project.^{53,54,55} The authors found that a cross-sector intervention (health, industry, research, farmer groups, and service delivery) is an effective method for improving the health, wellbeing and safety in farm men and women and their families. Further detail about the projects can be found in Appendix 3.

2. Warning signs and symptoms

Several resources outlining the warning signs for stress, depression and suicide were identified in the literature.^{43,44,45,46,47} These are summarised in the tables below.

Table 3: Warning signs of stress

Physical	Emotions/mental	Behavioural/relationship
<ul style="list-style-type: none"> headaches indigestion or stomach upsets, skin rashes, muscle tension and pain, clenched teeth rapidly beating heart, shortness of breath or shallow breathing raised blood pressure loss of enjoyment and interest in activities usually enjoyed loss of energy and constant tiredness changes in sleeping patterns, sleeping difficulties despite physical exhaustion, or sometimes sleeping too much memory, concentration or decision-making problems loss of appetite or over-eating 	<ul style="list-style-type: none"> feeling irritable, impatient or emotional for no apparent reason frustration depression angry blow-ups difficulty controlling emotions loss of confidence, low self-esteem persistent worrying about little things continuous feelings of anxiety and tension loss of motivation or commitment a sense of being out of control 	<ul style="list-style-type: none"> doing risky or careless things (excessive drinking, gambling, drug use) isolation by avoiding people, places and events working longer hours but with diminishing effectiveness poor work performance – less output, lower quality deteriorating relationships with colleagues, communication problems, verbal and or physical abuse, sarcastic arguments poor time keeping difficulty retaining information inability to relax or sleep trouble adapting to changing circumstances

Table 4: Warning signs and symptoms of depression

Physical	Emotions/mental	Behavioural/relationship
<ul style="list-style-type: none"> headaches and other aches and pains appetite and/or weight changes digestive disorders chronic pain sleeping difficulties feeling tired, with no energy 	<ul style="list-style-type: none"> feelings of dejection, loss and emotional numbness that does not go away and may be worse at a particular time of day feeling guilty about things that have nothing to do with you having problems thinking clearly, concentrating or making decisions thoughts of death, suicide or suicide attempts impatient, irritability and restlessness 	<ul style="list-style-type: none"> lack of interest in sex losing interest and pleasure in usual activities anger and hostility towards family, friends and others alcohol and/or drug abuses

Table 5: Warning signs that someone might be suicidal

Physical	Emotions/mental	Behavioural/relationship
<ul style="list-style-type: none"> anxiety, agitation, inability to sleep or sleeping all the time 	<ul style="list-style-type: none"> hopelessness rage, anger, seeking revenge feeling trapped dramatic change in mood stating there is no reason for living, or having no sense of purpose in life 	<ul style="list-style-type: none"> talking or writing about death, dying or suicide someone threatening to hurt or kill themselves, direct, or indirect statements, eg 'I wish I were dead' looking for ways to kill themselves eg seeking access to pills, weapons etc. acting recklessly increasing alcohol or drug use withdrawing from friends, family or society giving away possessions

3. Coping strategies

Coping strategies were identified within different settings such as the work, home and community. Coping strategies also fell into two categories around attitudes and behaviours. These are summarised below.

Table 6: Summary of coping strategies

Setting	Coping Strategies
At work	
<i>Attitudes</i>	<ul style="list-style-type: none"> • Set realistic goals and expectations daily ⁴⁶ • Emphasise what was accomplished, not what failed to be accomplished ⁴⁶ • Be positive about change and the need for change such as using new technology, or producing what the market wanted ⁶¹ • Shift from worrying to problem solving ⁴⁶ • Be persistent and take active steps to ensure sustainability ⁶¹
<i>Behaviours:</i>	<ul style="list-style-type: none"> • Change priorities, prioritise tasks to make work habits more efficient ^{46,61,63} • Reorganise farm life eg: <ul style="list-style-type: none"> ○ prior to stressful seasons, such as planting or harvest, determine who will take care of everyday chores ⁴⁶ ○ plan ahead - replace work machinery parts during the off season instead of at the last minute ^{46,62} ○ change what is farmed ⁶¹ • Grow the business to a level where a full-time person could be employed ⁶¹ • Let your bank manager and accountant know of all the issues so they can help ⁶³
At home	
	<ul style="list-style-type: none"> • Seek support from your spouse ⁶³ • Accept that long work hours are needed ⁶¹ • Take time out off the farm and spend time with family and friends ⁶³ • Turn off the phone ⁶³
At the individual level	
<i>Attitudes</i>	<ul style="list-style-type: none"> • Be aware of and set achievable goals ⁶¹ • Accept situations and adopt active coping strategies ⁶² • Develop a strong sense of purpose particularly in relation to caring for the environment ⁶¹ • Accept there will always be change, develop resiliency and the ability to survive challenges ⁶¹ • Seek out solutions to conflict ⁶³ • Aim to put fun and laughter in your life ⁶³
<i>Behaviours</i>	<ul style="list-style-type: none"> • Talk about your worries: talk to a friend, partner, parents, doctor, counsellor or clergy ^{43,63} • Allow more time for administrative tasks and free time ⁶¹ • Eat well and avoid foods that increase tension – coffee, tea, chocolate, alcohol and soft drinks ⁶³ • Don't always put the farm first - have other interests ⁶¹ • Make time to exercise ⁶³ • Get sufficient sleep ⁶³ • Learn to be more assertive and say no to extra commitments ^{46,63}
In the community	
	<ul style="list-style-type: none"> • Seek support and advice from friends and colleagues ⁶³ • Take a break away from farmers and talk to friends from different backgrounds ⁶³ • Talk to your doctor; they will let you know what options are available ⁶³

The most common coping strategies were planning, acceptance and active coping. The least commonly used strategies were religion, behavioural disengagement, denial and alcohol and/or drug use.⁶²

4. How to help those in need

This theme did not feature prominently in the literature but it is one that could be further developed in the future. The resource 'Down on the Farm' provided information about what to do if someone seems suicidal which included:

- take their thoughts and feelings about suicide seriously and listen to them without judgement
- encourage them to get help and talk to someone about how they feel
- approach services for advice (a list of services, websites, and helplines was provided).⁴³

Findings about accessing services and the help GPs can provide

Two studies found that prior to committing suicide farmers had accessed services:

- in Queensland, Australia, forty per cent of adult male farmers who died by suicide, had accessed some type of professional mental health help prior to their death³⁴
- in England and Wales, two-thirds of farmers who committed suicide had seen their GP in the previous three months but often with physical symptoms.¹⁷

Further studies confirmed that some farmers visiting their GP for a physical check-up may also be experiencing mental health problems.^{64,17} Furthermore, farmers may not access services due to a lack of confidence in the service and/or be worried about the lack of confidentiality.^{7,36}

These findings raised questions about the services available to farmers and if they were appropriate for their needs. Recommendations were made in the literature that GPs should also assess farmers for mental health problems when they present with physical problems. In response to the evidence regarding the use of firearms by farmers to commit suicide, it was thought the removal of firearms should be considered if a farmer is diagnosed with a mental illness.⁶⁴

In Australia, a guide was developed for GPs for how they can best support farmers.⁶⁵ The advice set out in the guide below reflects some of the recommendations made in the literature.¹⁷

Table 7: Suggestions for Australian GPs dealing with farmers as patients

Suggestions for dealing with farmers as patients
<ul style="list-style-type: none">• Recognise that farmers tend not to talk with others about stress or other concerns; they may not find it easy to talk with their family or GP.• Getting help early is important – think about how your practice can overcome delays in appointments, or how to explore urgency of need (this may not be expressed directly by the caller).• Take the opportunity to assess emotional or social concerns and mental health, even if the patient is presenting for a physical 'check up' or treatment of a physical condition (eg injury).• Ask about farming pressures, and how the farmer is coping with these.• Ask about family pressures.• Talk about ways of managing through difficult times, for example:<ul style="list-style-type: none">○ maintain social support and social connections○ get good advice about finances and farm plans○ monitor effect of stress of self.• Follow up – encourage and explain importance of returning to check how things are going.• Talk openly about the potential effects of strain and distress and ask about any suicidal ideation.• Ask about worries, especially about physical health – they can be a key to stress levels.• Ask about alcohol use and talk about the risk of increasing alcohol use to cope with stress.• Encourage family problem solving – talking with their family about problems and seeking solutions together will help to feel more supported and understood.

5. Summary

This review provides an overview of key findings from the literature regarding farmers' mental health with a particular focus on prevention and early intervention. The review provides a thematic analysis of the available literature. Time did not permit assessment of the many strategies and programmes to determine their effectiveness.

Further work is needed to conduct a systematic review of prevention and early intervention initiatives. This will help to better understand which strategies and programmes are the most effective regarding:

- improving the mental health of farmers and their families
- preventing the onset of mental health problems
- intervening early when the signs of mental illness become apparent
- the most useful resources for farmers and their families.

It is anticipated this review will support the further development of the Farmers' Mental Wellbeing Stakeholder Group's draft 'Farmer Mental Wellness Strategy and Action Plan' and inform future programmes and initiatives in New Zealand.

Appendix 1: Search methodology

Data base search

Data bases searched included PubMed, Medline, EPIC, CINAHL (nursing database), and Google Scholar. The search was conducted from 29 to 30 May 2014. Search terms included 'farm*', 'agricult*', 'mental illness', 'suicide' and 'depression'. Studies were restricted to English language, and to studies within the following places: New Zealand, Australia, Canada, the United States and the United Kingdom, Western Europe and Scandinavia based on the literature review request.

Internet search for referenced papers

The internet was used to source papers referenced in previously identified papers. During these searches other papers were also identified. The internet was also searched for papers using the following terms: 'farmers', 'mental health', 'mental illness', 'stress', 'anxiety', 'depression' and 'suicide'.

Papers and reference lists submitted by key stakeholders

Further papers were provided by key stakeholders. Papers specifically related to the topic were included and references in these papers were searched as part of the internet search as outlined above.

Appendix 2: NSW Blueprint

The 'NSW Farmers Blueprint for Maintaining the Mental Health and Wellbeing of the People of NSW Farms' (the Blueprint) is underpinned by the 'National Action Plan for Promotion, Prevention and Early Intervention for Mental Health 2000' and recognises that:

- *'treatment interventions alone cannot achieve the significant reduction in personal, social and financial burdens associated with mental health problems and mental disorders, and interventions are required earlier in the development of these conditions*
- *mental health is influenced by a wide range of risk and protective factors occurring in the many domains of life; and therefore*
- *effective action to promote mental health and prevent the development of mental health problems and intervene early in mental disorder requires the cooperation, commitment and partnerships that reach well beyond mental health services.'*⁴⁰

Table 8: The NSW Farmers Blueprint for Maintaining the Mental Health and Wellbeing of the People on NSW Farms

Pathways to breakdown	Pathways to health: 22 areas of action
External pressures on the business <ul style="list-style-type: none"> • Economic, markets • Regulatory • Climatic 	<ol style="list-style-type: none"> 1. Advocacy for farm support 2. Advocacy for improved regulations
High stress levels on the business, the family and individuals	<ol style="list-style-type: none"> 3. Programs to increase business, family and personal resilience 4. Access to Rural Financial Counsellors 5. Access to Drought Support Workers 6. Access to appropriate welfare
Feelings of loss of control	<ol style="list-style-type: none"> 7. Practical assistance in compliance with regulatory requirements
Poor problem solving/rigidity/high expectations/difficulty coping with change	<ol style="list-style-type: none"> 8. Change management skills development
Loneliness/social isolation	<ol style="list-style-type: none"> 9. Local community building programs – building social networks/opportunity 10. Professional network building
Feeling of worthlessness, hopelessness, despair	<ol style="list-style-type: none"> 11. Building positive view of farming from city perspective 12. Farm Pride campaign
Alcohol misuse	<ol style="list-style-type: none"> 13. Improved access to drug and alcohol programs and services
Lack of knowledge/insight into the nature of mental health problems in rural NSW/available services	<ol style="list-style-type: none"> 14. <i>Mental Health First Aid</i> training 15. Reducing stigma associated with mental disorder
Clinical depression/other mental disorders	<ol style="list-style-type: none"> 16. Improved access to effective mental health resources 17. Improved access to effective mental health services, including Primary Care detection and treatment
Family breakdown	<ol style="list-style-type: none"> 18. Improved access to counselling services
Previous suicide attempt/suicide threats/suicide plans	<ol style="list-style-type: none"> 19. Access to crisis lines
Access to firearms	<ol style="list-style-type: none"> 20. <i>Mental Health First Aid</i> for farm family members and community
Suicide	<ol style="list-style-type: none"> 21. Debriefing and counselling services 22. Appropriate media

The Blueprint brings together existing resources such as the MHFA training and the Rural Support Line as well as identifying the lead agency for each area of work. It is informed by seven recommendations for the development of an effective mental health promotion program presented in an international review of mental health promotion effectiveness by Jané-Llopis and Barry.⁶⁶

1. Programs based on principles of efficacy and a process that is empowering, collaborative, participatory and that includes partnerships with key stakeholders.
2. Key goals and objectives clarified and resources specified for effective implementation including training and support mechanisms.
3. Key factors identified – for example, a needs assessment of the population and an analysis of the determinants of mental health undertaken.
4. Support to capacity building and training in mental health promotion for effective action across a range of settings.
5. A system of monitoring and evaluation of process, impact and outcome evaluations of mental health indicators instituted.
6. Programs build on existing mental health promotion programs – a mental health promotion component is integrated with programs already being implemented, such as home-based educational interventions, health promotion in the workplace and in the community.
7. Programs take into account their feasibility, efficacy and sustainability in settings with low levels of infrastructure across diverse cultural and economic settings.

Three critical success factors to the development of the Blueprint were:

1. Health professionals took the opportunity to partner with a range of key organisations bringing an evidence-based approach to the problem.
2. There was decisive leadership from within the farmer population group and among service providers with the NSW Farmers Association providing an institutional base for leadership. Similarly, the NSW Centre for Rural and Remote Mental Health provided a leadership role including supporting rural mental health workers.
3. The development of networks and connections amongst agencies who previously did not know about each other or the services they each provided.

Appendix 3: Victorian research projects

Three research projects from Victoria Australia were identified: the Sustainable Farm Families (SFF) project,⁵¹ the Sustainable Dairy Farm Families (SDFF) project,⁵² and the Farming Fit project.^{53,54,55} These are discussed below.

SFF and SDFF projects consisted of:

- a structured two-day workshop in year one and a one-day workshop in years two and three
- pre and post-session knowledge survey exploring current knowledge related to health, wellbeing and safety topics
- an initial assessment covering cholesterol, blood sugar, weight and height, body mass index, blood fat percentage, blood pressure and pulse, waist and hip measurement followed by a healthy breakfast
- a 30 minute comprehensive physical assessment including discussions on specific topics as part of the assessment
- referrals to other health professionals
- re-assessment in subsequent years of the program
- focus group discussions prior to topic delivery
- development of an action plan (this was received well by participants with 96% of forwarding their action plan).

The program was built on several theoretical models including:

- Azjen and Fishbein's theory of 'reasoned action and planned behaviour'
- Kolb's learning cycle which allows participants to follow a systematic approach to identify and comprehend new information
- Kirkpatrick's training evaluation framework covering four levels of: positive experience, conceptual understanding, can the learnings make a difference, and demonstrable outcomes
- Rodgers research on the diffusion of innovation and how new ideas and practices are adopted in groups.

Key findings

- over 60% of men and 70% of women had health indicators high enough to warrant referral to health specialists
- significant changes in knowledge was retained over the three years of the intervention
- participants began to think differently about managing work on the farm with 54% of responses concerned with improving farm safety and considering improving their health.

Overall the program provided evidence that farmers will engage with health professionals if programmes are presented to them in personally engaging and relevant ways.

Further findings from the SDFF project

Participants from the SDFF project identified two to three actions to improve their health, wellbeing or safety. These actions often linked to their clinical results suggesting that the participants' were aware of areas they needed to address. It was found that dairy farmers focused more on stress management while the broadacre farmers focussed more on diet and exercise. This was reflected in their clinical results over the three years of the programme with broadacre farmers showing greater reductions in cholesterol, total blood sugar, blood pressure and waist circumference results.

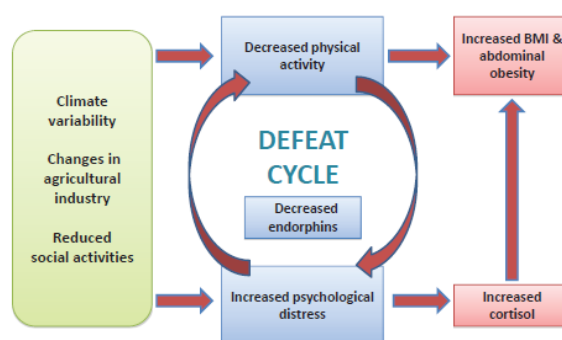
The authors reported that the SDFF programme influenced participants' decisions regarding diet and nutrition, exercise, behavioural (safety) and lifestyle factors through increasing knowledge, objective measurement of health indicators and subsequent changes through documented action plans. Participation in the SFF program was associated with an improvement in some clinical indicators.

The Farming Fit Study

The aim of the Farming Fit study was to examine the effects of physical activity on psychological distress, obesity and health behaviours such as diet patterns and smoking in male and female farmers. Interest in this area appears to have been initiated on the basis of previous findings involving 1813 farmers in the SFF programme which revealed that 64.3% were either obese or overweight and that the presence of abdominal obesity was 8.7% higher than the Australian national population. In addition to this, Research conducted by the National Centre for Farmer Health between 2004 and 2009, revealed a correlation between obesity and psychological distress among the farming community where suicide rates were recognised as high.

To underpin the study and to show the links, a logic model was developed of the 'farming fit cycle' describing the complex relationship of psychological distress and obesity among farmers.

Farming fit study model illustrating the relationship between psychological distress, physical activity and obesity.



Overweight farmers were recruited from the SFF programme and a quasi-experimental control-intervention methodology was to be used to examine the effects of physical activity on psychological health and other co-morbidities such as obesity and hypertension. The intervention involved an individualised six-month exercise coaching programme, coaching and consultation support on the programme over the six-month period, regular monitoring, a diet and physical activity questionnaire, and clinical results gathered.

Results of the Farming Fit study

The study showed significant reductions in body weight and waist circumference. However, no effects were found in cortisol levels, depression, stress or anxiety. The authors suggested that the limitations of the study with less participants recruited than anticipated, may explain the lack of change in Depression and Anxiety Stress Scale scores and cortisol levels. The authors also thought that the timing of the study which involved participants affected by drought made it impossible to estimate the effect of the drought on the outcomes in the intervention and control groups particularly in relation to mental health and cortisol secretion.

As part of the Farming Fit project a Farming Fit DVD was also produced to show farmers how to best utilise the infrastructure of their farm to assist them in strength training and stretches.

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