Title: Farmers' mental health and climate change: A review of the evidence

REVIEW PAPER

Abstract

Climate change is exacerbating climate variability, evident in more frequent and severe weather-related disasters, such as droughts, fires and floods. Most of what is known about the possible effects of climate change on rural mental health relates to prolonged drought. But, though drought is known to be a disproportionate and general stressor, evidence is mixed and inconclusive. Over time, like drought, other weather-related disasters may erode the social and economic base on which farming communities depend. Rural vulnerability to mental health problems is greatly increased by socio-economic disadvantage. Related factors may compound this, such as reduced access to health services as communities decline and a 'stoical' culture that inhibits help-seeking. Australia has the world's most variable climate and is a major global agricultural producer. Yet, despite Australia's (and, especially, rural communities') dependence on farmers' wellbeing and success, there is very little – and inconclusive – quantitative evidence about farmers' mental health. The aim of this review is to consider, with a view to informing other countries, how climate change and related factors may affect farmers' mental health in Australia. That information is a prerequisite to identifying, selecting and evaluating adaptive strategies, to lessen the risks of adverse mental health outcomes. We identify the need for a systematic epidemiology of the mental health of farmers facing increasing climate change-related weather adversity.

197 words

Key words

Mental health, climate change, farmers, rural, Australia, adaptive strategies

[MAIN TEXT]

Climate change is beginning to exacerbate climate variability in Australia[2], already the world's most variable climate. Increasingly, climate change contributes to more frequent and intense droughts, floods, fires and other weather-related disasters[3], thereby affecting health, particularly in vulnerable places and among vulnerable people[4]. Because of their closeness to and direct reliance on the land, such disasters may disproportionately affect farmers' health and wellbeing[5]. Media reports[6] and politicians frequently assert that climate change-related environmental adversity causes mental health problems. For example, the Australian Government minister for Agriculture spoke recently of how prolonged drought leads to depression and self-harm among Australian farmers[7]. However, studies that include measurement of the prevalence of mental health problems among farmers in Australia have only just begun to be initiated[8, 9].

No scientific studies have examined associations between weather disasters and farmers' mental health in terms of different types of weather disasters, different types of farms and different climate change-related factors. Our aims are to (i) describe how climate change may impact on farmers' mental health and, thereby, on Australia's capacity to feed itself and much of the rest of the world, and (ii) provide summary information that may assist other countries in their considerations of the same topic. We argue that the present state of scientific evidence is insufficient to use as a basis for definitive policy development. We have not, therefore, provided detailed policy analysis or proposed comprehensive adaptation strategies. However, where appropriate, we have drawn out implications for adaptation policy and practice. For Australia and other countries, such information will facilitate the identification, targeting, implementation and evaluation of adaptive strategies, to lessen the adverse health impacts of climate change and its environmental and social sequelae.

A range of electronic scientific databases, such as MedLine, ProQuest and Web of Science, were searched to locate peer-reviewed publications featuring key search terms in three domains. These were: (i) climate change-related terms such as climate change, climate, weather, weather disaster, extreme weather event, drought, flood, cyclone, bushfire and wildfire; AND (ii) mental health-related terms, such as mental, mental health, mental disorder, affective disorder, mood disorder, depression, anxiety, general psychological distress, psychosis, hopelessness, despair, helplessness, suicide and PTSD; AND (iii) farmer-related terms, such as farmer, farming, agriculture and primary production. Because we wanted to produce a 'case study' style focus on Australia, recent relevant Australian Government and non-profit organisation reports were also included.

The paper commences with a review of the place of agriculture in the life of the Australian community and of the people who produce Australia's food and fibre. It then takes a step back to consider recent publicly expressed views about the relationship between climate and farmers' mental health before proceeding to look, firstly, at the prevalence and cost of mental health problems in Australia generally and, secondly, to examine mental health in its rural context. Risk factors associated with mental illness and the presence of such risks among Australian farmers are reviewed, before summing up the state of the science and future research needs regarding understanding the relationship between farming, climate change and mental health.

1 AUSTRALIAN AGRICULTURE, CLIMATE CHANGE AND MENTAL HEALTH

Agriculture is a vital part of Australia's economy[10] and of our way of life[11] (Box 1). Australian farming (including extensive pastoral lands) utilises 54% of Australia's landmass[12], generates up to $39 billion in gross value each year[13], contributes around 3% of Australia's Gross Domestic Product[14] and employs almost 320,000 people[12]. As Australia is 93% self-sufficient in food production[15], reduced farm productivity is likely to compromise our capacity to feed ourselves. Australia is also a source of food for around 40 million people a day in other countries, with about 55% of these people living in developing countries[16]. Consequently, any loss of agricultural productivity in Australian could mean food shortages among some of the world's

poorest people. Anything that poses a substantial threat to Australian agriculture and its long-term viability must command research and policy attention.

BOX 1 ABOUT HERE

Climate change poses one such threat[5]. In 2008, consistent with prevailing climatological theory, CSIRO scientists predicted greater climate variability in Australia, including more frequent and severe extreme weather events[2]. A few months later, extreme heat-waves brought record temperatures to 87% of Victoria[17] and generated the nation's worst recorded fire event. Just a year later, south-west Queensland recorded its worst flooding in more than a century while, downstream, 44% of New South Wales and more than 95% of Victoria and South Australia were in drought[18]. Farmers do not always see floods as disasters, despite the hard work associated with ensuring the safety of stock. In outback Queensland and New South Wales, much agricultural production depends on periodic flooding. Nevertheless, floods are disastrous for some farmers and, certainly, for property and businesses in the rural communities which sustain and depend on them. Over time, weather-related disasters can erode the social and economic base on which farming communities depend[5].

Through its adverse impact on communities, climate change poses substantial (largely indirect) risks to mental health[1] (Figure 1). Most of what is known about the possible effects of climate change on rural mental health relates to prolonged drought, although a recent study has linked dryland salinity to increased rates of hospital admissions for depression[19]. Generally consistent with the drought-related findings of large annual government surveys of farm businesses across rural Australia[20], small rural studies have reported widespread drought-related income erosion attributed to increased costs, decreased agricultural production, capital depreciation, loss of stock and increased personal and business debt[21]. Farmers, who are often asset-rich and cash-flow poor[5], particularly during times of drought, report especially severe drought-related economic hardship. To the extent that climate change increases these routine pressures, it will also place farmers at greater risk of developing the mental health problems with which these pressures may be associated. Indeed, should these increasing drought trends continue, a key issue for adaptation may be to support farmers financially and socially in managing a transition out of farming[5].

FIGURE 1 ABOUT HERE

Many rural and remote Australian communities are also service- and resource-poor, and these deprivations are strongly linked to health disparities[22]. Hardship flowing from climate change-related disasters can exacerbate these adversities by further limiting access to services[23]. As communities decline (Box 2), services (such as retail and trade outlets, schools and health services) shrink with them. Drought and other weather-related challenges can thus exacerbate a lack of resources, while the lack of resources simultaneously hinders drought recovery[24]. People unable to access support or to leave these communities may become increasingly disadvantaged as drought continues and community decline compounds[23], with consequent excess risk to their mental health.

BOX 2 ABOUT HERE

2 PUBLIC DISCUSSION ABOUT FARMERS' MENTAL HEALTH: INFORMED DEBATE?

The significance of farmers' circumstances, and their ramifications, is not lost on governments. On 2 March, 2010, the Hon. Tony Burke, Minister for Agriculture, Fisheries and Forestry, opened the Australian Bureau of Agriculture and Resource Economics annual conference by emphasising that two leading challenges confront Australian agriculture: globalisation *and climate change*[7]. He spoke about how structural factors have likely undermined farmers' adaptation to climate change: "for some [farmers], seven years ago, and instead of helping them get out [of unviable farm businesses], we gave them just enough money to hold them in a [fundamentally untenable] situation". He went on to note the harm he felt such policies have caused: "I am not surprised by a whole lot of mental health challenges that we have ….. [or by] the number of times when I go into a town people talk about the latest act of self-harm …..".

This statement is a recent, and a particularly prominent, public linking of climate change, macro-agricultural policy and mental health. There have been many others and there is no doubt that the weight of qualitative evidence and public opinion supports this notion: most studies identify

drought as a disproportionate[25] and general[23, 26] stressor for farmers. Yet few of these studies have demonstrated a link between general 'stress' and mental disorders, and none has shown that any specific disorder is attributable to drought. Only one small qualitative study identified depressive and anxiety symptoms as stress-related themes for a group of drought-affected citrus farmers[21]. Further, none of the publicly expressed views has been underpinned by nationally representative quantitative evidence linking climate change-related weather disasters to mental disorders among farmers.

Only one study has touched on farmers' mental health in terms of climate change, *indirectly*, via consideration of the impacts of prolonged drought. Edwards and colleagues[27] analysed psychological distress among 6,519 adults in rural and regional Australia for the period 2004 to 2007, linking the mental component of the SF-36 to area-level rainfall. While it did not consider climate change, the study enabled the rare quantitative comparison of mental health in drought-affected and non-drought-affected areas. Overall, economic hardship and mental health problems were greatest in areas of drought and among farmers compared with other rural dwellers. However, the authors failed to note that, at 17%, the prevalence of likely mental disorder found among farmers in the study was *below* the general Australian population prevalence of these problems, currently estimated at about 20% (excluding substance use disorders)[28]. A study of psychological distress in rural communities across New South Wales, undertaken at the height of the current severe drought, found that, while 34% of farmers demonstrated moderate and high scores using the Kessler 10-item measure of distress[29], other rural occupational groups were not dissimilar[9]. However, though no particular occupational grouping stood out, unemployed people demonstrated far greater levels of distress, with 50-69% demonstrating moderate to high levels.

Such findings raise the question of what makes Australian farmers so resilient in the face of so much apparent adversity. One possibility is that they benefit from the high levels of social connectedness often found in rural communities[30], which support good mental health[31]. From the point of view of adaptation, given that social capital is strongly protectively related to mental health[31, 36], prospectively supporting and enhancing this resource may prove beneficial[1]. The supportive role played by local advocacy organisations may also need to be considered.

However, though some of these organisations have managed to undertake useful research and propose some solutions, these successes have not resulted in increased help-seeking behaviour[9].

Other studies that have considered farmers' mental health separately from any associations with climate change factors have not presented conclusive evidence of significant (and certainly not substantial) differences in mental health between farmers and other Australians. However, Edwards et al. demonstrated that farmers' mental health was worse than that of other *rural dwellers* experiencing drought, even though it was not worse than general population mental health[27].

A study reported by Hogan and colleagues[32] that informed the recent 'Kenny Report', *It's about people: Changing perspectives on dryness*[11], investigated mental health among people in rural Australia compared to the urban population. This study analysed data on people living in rural Australia identified in the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a nationally representative panel study of approximately 19,000 respondents. Using the SF-36 mental component score, consistent with the Edwards et al. study, rural dwellers reported slightly but significantly *better* mental health than did other Australians (M_{rural} =75.6 *vs* M_{urban}=73.7, p<.01). A limitation of this study, and of the Edwards and colleagues study, was the use of the SF-36 as the screening instrument to gauge mental health. Though it is a fair indicator of the likely presence of mental health problems, the SF-36 does not diagnose or identify specific disorders or cases.

With respect to mental wellbeing, rather than to mental disorders, the life satisfaction of 500 farmers and farm workers in drought was compared with that of the general rural population in a national study of 1,202 adults[33] using the Personal Wellbeing Index-Adult[a] (PWI-A)[34]. Statistically significant differences were evident between drought-affected farmers and the comparative sample of non-farmers from rural Australia for eight of the nine domains of life satisfaction that comprise the PWI-A. Farmers reported feeling safer, having better personal relationships, being healthier and feeling more part of their communities than did other rural Australians.

a Note: the Personal Wellbeing Index is a forerunner to the similarly-named 'Deakin Wellbeing Index'.

However, farmers also reported being less satisfied with their lives on the whole and with their levels of achievement, security about their future and spirituality. These are important findings because of the relationship between a positive sense of the future (versus feelings of hopelessness about the future, discussed below) and mental health and wellbeing. The findings are also consistent with a very recent study of 3,993 Australian farmers, in which almost 20% reported that they could not cope with any more change, 7% reported lacking confidence in their ability to cope generally, and 43% reported low levels of social trust (trust in others not personally known to you)[35]. Confidence in the ability to cope (sometimes referred to as trait optimism or self-efficacy) and social trust are central components of social cohesion, and strongly linked to better mental health in rural Australia[36]. Where confidence and trust are eroded, so too will be mental health. Significantly, for policies to be effective in promoting adaptation, they will need to convince farmers that their best interests have been considered (the basis of social trust[36]).

A further limitation of the few studies that have been published in this field is that none has taken account of the heterogeneity of rural communities and of agricultural businesses, or examined differences among different groups of farmers (such as younger or older farmers, casual farm labourers, women or Aboriginal and Torres Strait Islander peoples). However, a very recent report using cluster analytic techniques to develop statistically-based 'profiles' of different types of farmers identified three types with distinctively different farm-related and socioeconomic characteristics, climate change-related adaptive capacity and self-rated health[35]. Though the study did not discuss mental health, it provided indicative evidence of health disparities *by type of farmer* (discussed further below).

Despite considerable uncertainty and lack of evidence about the extent and nature of the relationship between climate change, drought and health, the findings of the Edwards and Kenny reports were widely presented in the media as conclusive evidence that drought and climate change are harming mental health[37]. This is not a criticism of the media, who are to be commended on taking up this important issue, but an indication of the need for better science to inform public debate.

3 PREVALENCE AND COSTS OF MENTAL HEALTH PROBLEMS

Psychiatric disorders have been estimated to comprise at least 14% of global disease burden[38]. One-in-five Australian adults experiences a mental health problem each year (one-in-four if substance use disorders are counted)[28]. These problems have long been the leading cause of non-fatal disease burden, accounting for nearly one-third of years lost to disability, and are the second largest contributors to (lost) disability-adjusted life years[39]. The direct economic costs of mental health problems in most developed countries are substantial[40]. Service costs alone accounted for $3 billion (6%) of Australia's total health care expenditure in 2001[41], $3.3b in 2007-08[89]. At a human level, mental disorders are associated with profound suffering. Among fifteen serious illnesses, severe depression has been ranked third in severity behind quadriplegia and being in the final year of a terminal illness[42]. Other costs of psychiatric disorders are documented in areas as diverse as education, housing, welfare and the criminal justice system[40].

Because of Australia's geography and population dispersion, there is growing research and policy interest in the mental health of people living in rural and remote areas (for a review of rural circumstances and climate change, see Hanna et al., this issue). Rural people live with substantial health disadvantage, most likely due to disadvantaged socio-economic circumstances rather than to characteristics intrinsic to the rural setting[22]. This is not surprising, with the relationship between material hardship and poor mental health having long been documentedFaris & Dunham, [43, 44].

Significantly, most Australian farms are still family businesses[45], so there are intergenerational implications with deterioration in economic conditions in rural areas over time associated with depression and demoralisation amongst both parents[46] and children[47]. Mental health problems also place a great burden, financially and emotionally, on carers, some of whom are children: growing up in families with a parent with mental health problems confers a significantly increased risk of developing mental health problems or disordered behaviour, both contemporaneously, as children, and into adulthood[48]. This has implications for adaptation policy, which must take account of child and lifecourse development, family functioning and intergenerational dynamics[67].

4 MENTAL HEALTH, DROUGHT AND HOPELESSNESS IN RURAL AUSTRALIA

Despite the heterogeneity of rural and remote communities, some general points apply. Vulnerability to mental health problems is highly dependent on sociodemographic factors[22], including sex, age-group and occupational classification[9]. Rural Australians experience very high levels of disadvantage[22] and their disadvantage is strongly related to their physical and mental health[22, 49]. They endure substantial inequality of psychiatric service provision, as well as difficulty and disproportionate expense in accessing these services[50]. Many rural Australians feel socially and politically marginalised[23, 51, 52]. Complicating this scenario, the mean age of the Australian farm workforce, at 58 years[11], exceeds Australia's average retirement age of 52 years [53]. Climate change-related factors that exacerbate mental health problems will inevitably complicate the effects of cognitive decline and physical health problems that frequently accompany ageing. However, the higher average age of rural Australians may account, in part, for the findings that seem to suggest that rural Australians report *better* mental health than their urban counterparts, as the prevalence of most mental health problems declines with age[54].

Drought-prone areas are chronically vulnerable to low socioeconomic status and educational attainment. Drought-related deterioration in socioeconomic circumstances in rural areas is linked to higher levels of distress and helplessness[55]. This is because, over time, people who are repeatedly exposed to uncontrollable negative life events learn to 'give up', becoming helpless and, eventually, hopeless (Box 3) and this is strongly related to depression[56]. In somewhat of a contradiction, resilience has been found among farmers alongside hopelessness[24, 26]. For example, Hogan et al.[33] reported that while farmers and farm workers reported significantly *better* wellbeing than did non-farmers on many aspects of life satisfaction, they also reported less hope for their future. Further, while rural children (like their parents) appear to be resilient for a time to many of the adverse mental health effects of drought, with prolonged exposure, they also begin to give up hope[47]. Patel[90] has offered a possible explanation proposing that, in the face of limited options, many farmers have little choice but to persist with (and even invest further in) their current farming endeavour in the hope of trading their way out of their current situation.

Such persistence may be confused with resilience. Whatever the explanation, lack of hope for the future among farmers and their children, despite apparently high levels of general life satisfaction and resilience, is a salient finding because hopelessness is prospectively linked to depression, even suicide (Boxes 3, 4).

BOX 3 ABOUT HERE

Hopelessness among farmers may be related to their concerns about the viability of their businesses: self-assessed financial viability is strongly predictive of farmer health[35]. In the Kenny report, some 45% of farmers reported that they did not consider themselves financially viable based on their financial performance for the past five years[32].

BOX 4 ABOUT HERE

5 STOICISM AND HELP-SEEKING AMONG FARMERS

The links between climate change, rural decline, hopelessness and mental health are of continuing serious concern partly because of norms of stoical behaviour among farmers and consequent lack of help-seeking. This has bearing on the choice of, and likely effectiveness of, community- and household-level interventions, to lessen the risks to mental health from climate change and its sequelae. Help-seeking is acknowledged to be important to successfully managing and recovering from mental health problems[57, 58] and doing so promptly is especially relevant to prevention and early intervention.

Reluctance to acknowledge mental health problems is common and, although not unique to men or to rural Australia[59], mental health stigma is widely reported among rural and remote-dwelling Australians[60]. For many farming men, drought-related adversity and vulnerability have been reported as threats to their sense of masculinity[23, 26, 61], identity as a farmer[61] or traditional role[61]. Some studies have linked stoicism to reluctance amongst farmers (particularly older farmers) to seek financial aid[23], and to increased social isolation[26] and a need to maintain an appearance of coping or self-reliance[62]. Recently, stoicism has been linked to lower quality of life due,

especially among rural Australian men, and to a general reluctance to seek help, instead relying on oneself[63].

In a study of drought-affected South Australian citrus farmers, self-reliance, social image and lack of knowledge were all barriers to help-seeking[21]. An international review of rural literature also found stoicism, self-efficacy and stigma created barriers to seeking professional help for mental health problems[64]. Many other factors in the rural and remote context also contribute to inhibited help-seeking. Sociodemographic and economic circumstances (for example, poverty), type and severity of mental health problem[64] and limited accessibility and availability of appropriate services[65] all play a part. Thus, rural socio-cultural factors have been associated with inhibited help-seeking, especially for mental health problems[61 142, 65]. Furthermore, differences in farmer and non-farmer attitudes towards help-seeking, mental health and resilience might explain higher suicide rates amongst farmers[66].

Importantly, some of the contradictory findings regarding farmers' mental health and wellbeing might be due to the failure of studies to account for heterogeneity among farmers. Farmers are a diverse population group comprising older Australians, women, Aboriginal and Torres Strait Islander peoples, and many different types of farming roles and tenure. A recent study investigating factors associated with Australian farmers' climate change-related adaptation used cluster analytic techniques to define and describe three different types of farmers. These were 'cash poor long-term adaptors', 'comfortable non-adaptors' and 'transitioners'[35]. The study found systematic inequality in the on-farm conditions, number and range of farming-related pressures, distribution of resources and access to services among the three types of farmers. The most disadvantaged group, the transitioners, also reported the poorest health, while the comfortable non-adaptors, who were the most advantaged group, reported few health problems.

6 THE STATE OF THE SCIENCE AND FURTHER RESEARCH QUESTIONS

Although there is a growing literature on farmers' circumstances, rurality and possible links to mental health, currently there is inconclusive evidence for the proposition that (all) farmers have elevated rates of mental health problems, even in the face of extreme adversities. It is apparent

that Australian farmers are resilient, but it is not evident what makes them so, nor why they report substantial satisfaction in many domains of life and simultaneously report feeling hopeless. Further research needs both to investigate specific mental disorders (particularly the common disorders, such as anxiety and depression) alongside resilience and *good* mental health. Studies comparing farmers' mental health *and wellbeing* to that of other Australians would help elucidate these matters, as would investigating which climate change-related and other key health determinants are linked to their health outcomes, good and bad. Overall, it is still not clear whether some or all farmers have worse or better mental health than other Australians and, if so, to which climate change-related, social, economic, demographic and farm factors this may be attributed.

Additional topics that need to be examined, to elucidate patterns of risk to mental health and to facilitate the choice of supportive or adaptive strategies, include:

1. The prevalence of depression, anxiety, psychological distress, legal (alcohol and tobacco) substance misuse, hopelessness, happiness and life satisfaction among Australian farmers.
2. Assessment of whether the prevalence of any of these mental health problems or indicators of wellbeing is greater or lesser among farmers than it is compared with the general population and other rural residents.
3. Climate change-related (if any), social and community, economic, demographic and farm factors associated with mental health problems or indicators of wellbeing.
4. The prevalence of mental health problems or indicators of wellbeing by type of farm, type of farmer or type of climate factor.
5. The intergenerational transmission of disadvantage and its mental health consequences amongst farming populations.
6. The effects of climate change-related adversity on children and young people. As most mental disorders emerge during youth, the impact of climate-related hardship during this vulnerable life-stage requires special consideration.
7. The consequences of climate change for casual farm workers. These workers, who are disproportionately Aboriginal[67], experience considerable financial pressure as they are first to lose their jobs in times of economic downturn on farms.

CONCLUSION

A great deal rests on the success and wellbeing of Australian farmers and there are clear and credible signs that their health and wellbeing may be compromised by climate change-related adversity. Drought, economic hardship and out-migration (especially of the young) has left an aging farm population, altered the social structure of many rural communities[26], and had an adverse impact on personal and community morale[24]. Additional climate change-related pressures facing farmers[11, p.5] exacerbate the stresses inherent in farming[52, 68]. Farmers' poor sense of future is of considerable concern because of its possible links to hopelessness and suicide. While it is tempting to rush to causal inferences and, hence, policy interventions, we argue that farmers' mental health status, and its relationship to climate change-related factors, cannot be assumed but must be empirically studied. Emerging findings suggest that mental health problems might *not* be elevated among farmers as a group, relative to the general population – though averaged survey scores may mask systematic variation between types of farmer. Finally, the levels and sources of farmers' resilience must be considered, along with their place- and occupation-based vulnerability. The general population may have much to learn from rural Australia about maintaining wellbeing in the face of adversity.

3,964 words

Text boxes (534 words)

Text for Box 1.

Box 1. Drought and the Australian economy.

Drought has had a direct and considerable impact on the Australian economy. Between 2002 and 2003, a drought-related decrease in agricultural production resulted in a 1% fall in Australian GDP growth and a fall of 28.5 % in the gross value added for the agricultural industry[69]. Should the frequency of drought continue as predicted, it is estimated that it will cost the Australian economy $5.4 billion annually, with a projected ongoing reduction in GDP of 1% a year[70]. Although Australian rural dwellers are reportedly more drought-prepared than ever before[23], the cost of drought remains high in these areas and has significant economic flow-on effects[27, 71, 72]. Falling farm production has placed pressure on downstream industries, such as transport and wholesale trade, small businesses and casual mobile labour, including shearers and farm hands[69].

Text for Box 2.

Box 2. Rural decline and mental health.

Social connectedness, which is generally high in rural areas[73], where disasters such as drought often strengthen rural identity and cohesion[24], is strongly protectively linked to mental health[31]. However, declining economic conditions have contributed to significant income losses, increased poverty and an exceptional demand on charitable organisations[23]. This has been associated with rural community attrition, through the displacement of younger generations, a reluctance to take over failing family businesses and loss of hope for future prosperity[72, 74]. These factors have undermined cohesion in many communities[23, 24, 75] and just living in a declining area is detrimental to mental health[76].

Text for Box 3.

BOX 3. HOPELESSNESS AND MENTAL HEALTH.

Hopelessness can be defined as a system of negative expectations about one's future, coupled with a perceived inability to change these expectations (helplessness) and/or to achieve valued outcomes[77-79]. Clinical measures of hopelessness, such as the Beck Hopelessness Scale[77], reflect a multidimensional view of hopelessness, including lack of agency ('I might as well give up because I can't make things better for myself'), an inability to imagine the future ('the future seems vague and uncertain to me') and pessimism ('there's no use in trying to get something I want because I probably won't get it'). In this context, people experiencing hopelessness believe they will 'never get well' and 'have nothing to look forward to'[77]. Hopelessness has been called a sub-type of depression ('hopelessness depression'[78]), seen as the end result of a chain of negative inferences and feelings regarding particular life events. Prolonged hopelessness is prospectively linked to depression, substance misuse, other mental health issues, physical illness and even suicide[77, 79-84]. Notably, it has been identified as a significant predictor of suicide-related ideation[79, 83]. In community samples, hopelessness in the form of pessimism has been associated with negative mood, low social support and use of avoidant coping strategies for stress[84].

Text for Box 4.

BOX 4. SUICIDE.

Best estimates suggest suicides account for about 1.6% of all cause mortality[85], around 80% occurring among men[85] and accounting for more than 5% of male fatal disease burden[39]. Male suicide rates are higher in rural and remote areas than they are in metropolitan areas, and disproportionately elevated rates of suicide are found among Aboriginal Australians in some states and territories[85]. Australian studies have shown men in farming occupations have higher rates of suicide compared with the wider rural population or men nationally[86, 87].

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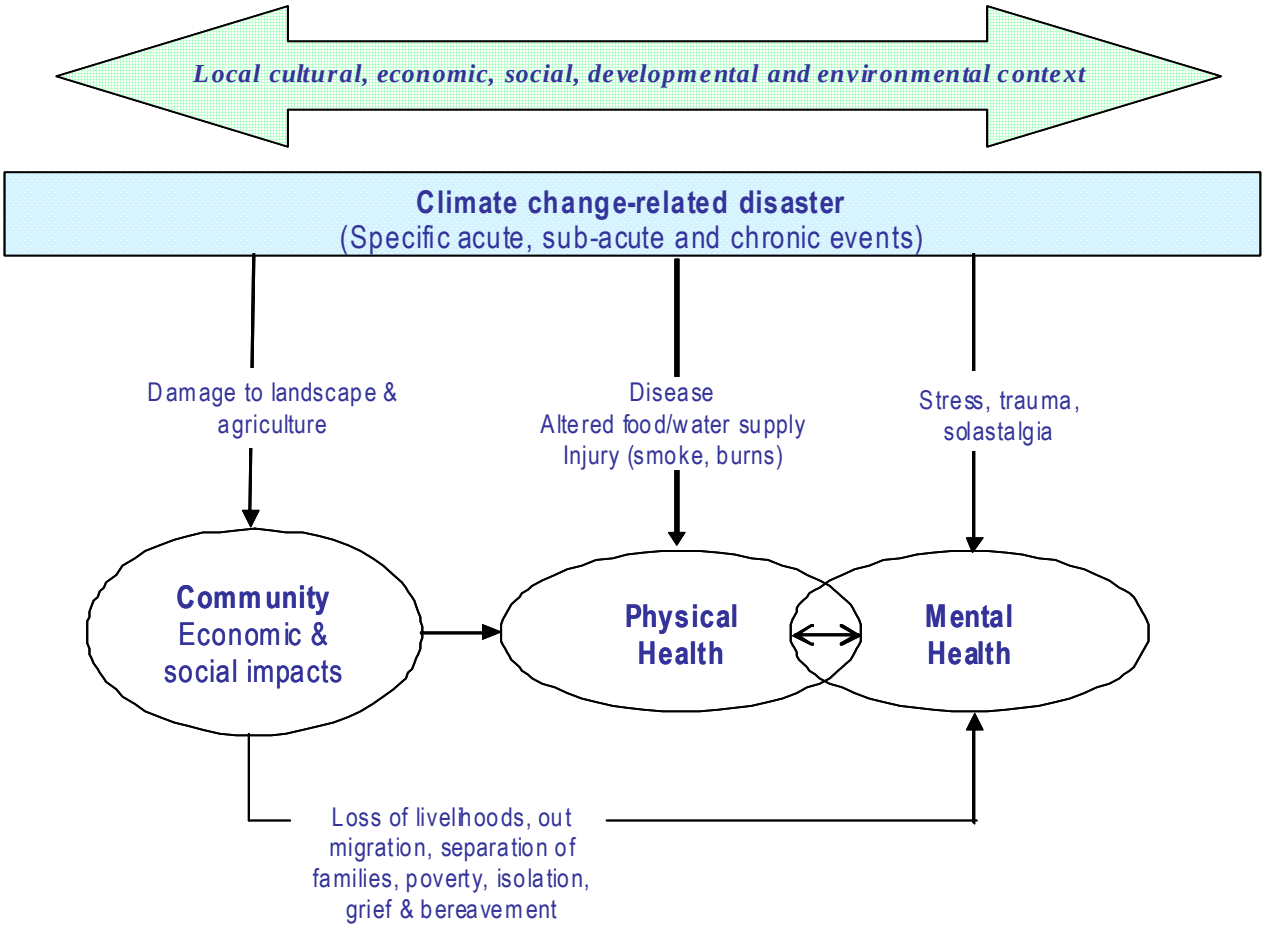
Acknowledgments

We are grateful for research assistance from Cheney Brew, Dr Léan O’Brien and Debra Harris.

Figure legend

Figure 1. Hypothesised pathways linking climate change and mental health[1].

Figure


Local cultural, economic, social, developmental and environmental context
Climate change-related disaster
(Specific acute, sub-acute and chronic events)
Damage to landscape & agriculture
Disease
Altered food/water supply
Injury (smoke, burns)
Stress, trauma, solastalgia
Community
Economic & social impacts
Physical Health
Mental Health
Loss of livelihoods, out migration, separation of families, poverty, isolation, grief & bereavement