Human activities – particularly the burning of fossil fuels – have released enough carbon dioxide and other greenhouse gases to trap additional heat in the lower atmosphere and affect the global climate.

Surface air temperature has warmed by 0.9°C since 1910. Daytime maximum temperatures have warmed by 0.8°C over the same period, while overnight minimum temperatures have warmed by 1.1°C. By 2070, temperatures are projected to rise another 1.0 to 2.5°C if greenhouse gas emissions are seriously reduced, or 2.2 to 5.0°C if emissions are not reduced (with inland temperature rises greater than on the coast).

2013 was Australia’s warmest year on record.

As a consequence, sea levels are rising, glaciers and icesheets are melting and precipitation patterns are changing. Extreme weather events such as heatwaves, bush fires, floods, droughts and cyclones will become more frequent and intense. The Bureau of Meteorology’s *State of the Climate 2014* report discusses the long-term trends in Australia’s climate. [www.bom.gov.au/state-of-the-climate](http://www.bom.gov.au/state-of-the-climate)

The vulnerability of communities to the health impacts of climate change is a function of a range of factors, such as age profile, pre-existing health conditions, awareness of the risks, socio-economic status, housing and the surrounding infrastructure (e.g. communications, transport, water and sanitation), exposure of particular livelihoods, and access to health services. An unfavorable combination of these factors leaves many communities in rural and remote Australia more vulnerable.

**Heat-related illness and death**

Heat-related illness and death is expected to increase, particularly in country areas where the ageing of the population is more marked, there is greater prevalence of chronic conditions, people live in more isolated physical and social circumstances, and homes are hotter.

Older people are more vulnerable because of the physiological effects of ageing (declining cognitive state, reduced sweating response, greater prevalence of chronic conditions and disability, reduced mobility), and the deleterious impact of prescribed medication on the body’s ability to cope with higher temperatures.

Aboriginal and Torres Strait Islanders, of whom two-thirds live outside the capital cities, have significantly poorer health (e.g. higher prevalence of cardio-respiratory disease), placing them at higher risk of heat-related illness and death.

Hospitalisation rates for asthma and chronic obstructive pulmonary disease (lung diseases that prevent proper breathing) are already substantially higher in remote areas, and this is likely to be exacerbated by warmer temperatures, coupled with elevated levels of airborne pollens and pollutants, such as bushfire smoke.

People in rural and remote areas are more likely to be socially isolated because of sparse populations and the lack of public transport. They may also be less mobile personally due to their higher prevalence of chronic conditions. Poorer physical and personal mobility makes people more vulnerable to injury and death from bushfires, drought, cyclone and flooding.

Homes in rural and remote areas are older and often lack the thermal efficiencies of newer homes (e.g. reflective roofing and insulation). Aged care facilities in rural areas are also generally older, smaller and hotter than those in urban facilities.
Mental illness and suicide

Poor seasons (a consequence of unfavourable weather conditions and extreme weather events) and the subsequent stresses of lost income, mounting debt and damage to property which befall farmers and their families are likely to prompt a rise in mental illness and harmful behavioural responses. This is expected to surface in the form of depression and anxiety, psychological trauma and post traumatic stress, drug and alcohol abuse, social withdrawal, relationship disharmony and, in extreme cases, self-harm and suicide.

Research has shown that, not surprisingly, farmers are subject to depression as a result of drought. Seventeen per cent of farmers who were in drought in 2008 had mental health issues, compared with 8 per cent of those who had not been in drought in the previous three years.

The rate of suicide among male farmers has been reported as almost fifty per cent higher than for rural men generally (which is substantially higher than that for men generally), with a direct correlation between prolonged drought, isolation and the rate of suicide.

Downward pressure on farm incomes flows through to those in service industries (eg. transport and machinery companies; the retail sector).

People living in rural and remote areas already feel the brunt of extreme weather events such as floods and bushfires, so they have particular concerns about increases in their frequency and intensity. It has been estimated that one in five people affected by natural disasters is likely to develop mental health problems.

Many Aboriginal and Torres Strait Islander people living in remote areas have a heightened sensitivity to ecosystem change due to the close connections between the health of their ‘country’, their mental wellbeing and the maintenance of their cultural practices. Major biophysical change therefore has the potential to affect their mental health.

Malnutrition

Drought, flooding and other extreme weather events can affect the price and availability of food, placing people at increased risk of malnutrition. Poor nutrition is associated with many disorders, including in relation to child growth and development and in later life. In remote areas, food prices are already up to 50 per cent higher than in capital cities. The availability of fresh food and vegetables declines with remoteness, and people living there are less likely to adhere to nutritional and dietary guidelines.

‘Food stress’ is the condition in which people cannot access fresh food on a daily basis, either because of availability (supply shortages; physical access) or price. During drought, food prices in Australia have risen at more than twice CPI, and people in rural and remote areas are generally less able to absorb such increases due to lower incomes.

On average Indigenous Australians, particularly those living in remote Australia, already have significantly higher rates of preventable diet-related conditions than non-Indigenous Australians. Up to 19 per cent of the health gap is attributed to diet. Changes in the amount and distribution of wildlife, fish and vegetation will have deleterious health consequences for people who follow a traditional diet.

Infection and disease

Access to clean water is essential for drinking, personal hygiene, bathing and food preparation. However some communities in remote Australia have no option other than to use water that is untreated or only partially treated - whether from a local water course, a bore or rooftop collection. Prolonged periods of drought will lead to greater reliance on such sources, which are more susceptible to contamination, particularly when raw water is of poor quality or when catchments are affected by events like flooding. Heavy rain and flooding can also cause contamination to such water supplies through mixing with agricultural pesticides and fertilisers, septic waste and animal carcasses.

Warmer temperatures will increase bacterial growth which can lead to an increase in food-borne infections (eg salmonella). The impact will depend on factors such as food hygiene practices, and the homes in some remote communities lack the equipment and resources necessary to safely store and prepare foods (refrigerators, potable water supply and waste management).

Remote Aboriginal communities are particularly vulnerable to food- and water-borne disease. In central Australia, for example, there is a relatively high incidence of Aboriginal children being admitted to care with diarrhoea. There are predictions of a national increase of 3-5 per cent in diarrhoeal admissions by 2020, and of 5-18 per cent by 2050.

The transmission of certain arboviruses such as Dengue and Ross River Virus will also increase, prompted by environmental conditions that enable breeding and survival; rainfall, tides, sea level, temperature, humidity and wind all play a part.

There is growing acceptance of the need for health services to be better prepared to respond to the impacts of climate change, and for acute disaster response capacity to be strengthened, particularly in communities of less than 10,000 people.