

Understanding the Social Impacts of Drought

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Acknowledgement of Country

In the spirit of reconciliation, CSI UWA acknowledges that their operations are situated on Noongar land, and that the Noongar people remain the spiritual and cultural custodians of their land, and continue to practise their values, languages, beliefs and knowledge. We acknowledge the Traditional Custodians of the country throughout Australia and their connections to land, sea and community. We pay our respect to their elders and extend that respect to all Aboriginal and Torres Strait Islander peoples.

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ACRONYMS AND ABBREVIATIONS

FHA	Farm Household Allowance
RFCS	Rural Financial Counselling Service
DCSI	Drought Community Support Initiative
CWA	Country Women's Association
RIC	Regional Investment Corporation loans
FMD	Farm Management Deposits
HILDA	Housing Income Labour and Dynamics in Australia

EXECUTIVE SUMMARY

The *Understanding the social impact of drought* report provides a comprehensive review of the evidence around the social impacts of drought and factors which may mitigate the adverse social impacts. This report also presents an overview of the factors which make a community more resilient to drought, and factors which make a community more vulnerable to drought. Different models and social frameworks have been sourced which can be used to assess community resiliency to drought within a community.

From a social impact perspective, drought is conceptualised as a socio-economic phenomenon rather than a lack of precipitation alone. The emphasis is on the impact that a lack of precipitation has on human activities at the individual, household, and community level. Research evidence suggests a key driver by which drought affects social outcomes (including significant health and well-being impacts) is the economic channel. But drought itself also directly impinges on social outcomes and there are significant indirect economic consequences from the various first-round social consequences.

The more severe the drought, the larger the social and economic impacts for farming families and local communities. The immediate and medium term direct and indirect social impacts of drought are diverse covering dimensions such as employment, education, out-migration, family relationships, mistrust of government, uncertainty over the future and community resources, and support systems. All these factors either directly or indirectly impact on health and wellbeing: physical, mental, social, and emotional wellbeing.

Government responses to drought includes initiatives such as the \$5 billion Future Drought Fund which provides secure, continuous funding for drought resilience initiatives to enhance drought preparedness. This fund has been used to establish Drought Resilience Adoption and Innovation Hubs, risk planning and drought risk management, released online tools to make climate risk and resilience information more accessible and useful, programs for drought preparation, and projects supporting land management practices to lessen the effects of drought. In Western Australia, \$28 million dollars has been allocated to local activities and projects.

Individual and community level resilience are described as 'synergistic' and taking actions to increase both is essential to managing drought in rural communities. Individual resiliency is impacted by personal (e.g., gender, attitude, perspective), community (e.g., social and community support, service access), and business (e.g., role diversification, succession planning) factors. Community resiliency, or the ability of a community to deal with adversity, involves recovery after collective and personal trauma through the use of mediating social, physical, economic and environmental resources. Community resilience can be described through a set of adaptive capacities – economic development, social capital, community competence, and information and communication. A community resilience assessment social framework allows operationalisation for measuring social resilience; with some (though by no means all) of the indicators and measures within the suggested domains (e.g., social structure, social capital), available in the public domain.

Drought vulnerability is a function of three major drivers: exposure to drought, the sensitivity of the community and the adaptive capacity of the community. Vulnerability assessments aim to identify vulnerable groups within a community and to determine ways to make the affected population less vulnerable, or more resilient with strong adaptive capacities through identifying underlying causes of risk. Dimensions related to social, economic, physical, crime and conflict, governance, environment and farming practice are deemed important factors to be measured as part of a vulnerability assessment and allow for drought management strategies to be based on risk management.

A transition roadmap has been developed for building resilience to the social impact of drought. The roadmap has been based on the resilience literature and includes four stages: infrastructure; governance; population retention; and social capital.

Recommendations

Availability and quality of Infrastructure

The availability and quality of infrastructure is essential to community resilience and mitigating the impact of drought. Ensuring communities have sufficient infrastructure to support the needs of the whole community, including local health and financial services, will support the health and wellbeing of the community during drought. It is recommended that vulnerability assessments include indicators of transportation, water and sanitation, energy consumption, water tanks, reservoirs, wells, water quality and road density.

Good governance

Governance involves drought plans and strategies, water management planning, and investment in disaster prevention and preparedness. Governmental support of drought risk management involving risk reduction, disaster management and recovery and adaptation will empower the community, improve the adaptive capacity of the community, and thereby enhance community resiliency to drought.

Population retention

Employment and financial constraints during drought lead to out-migration, impacting on social networks and the availability of local community services and employment opportunities. Population can be retained through government financial support, with loans and government payments providing income security for both farming and non-farming populations, decreasing out-migration and helping to retain employment within rural communities.

Increase local support service networks

Infrastructure and support services are essential to community resilience and in the development of an ideal resilient community. A lack of water supplies in the first instance but also support services, recreational facilities, work opportunities, public transport impairs community resilience. Drought is associated with the lack of availability, and higher rates of closures, of key services: banks, schools, hospitals, and medical practices. Rural financial counsellors have been shown to be trusted invaluable supports during drought, with their services perceived to be culturally appropriate.

Strengthening community social networks and social capital

Community events, support networks, and strong connections to the community are collective coping strategies used to support individual and family resilience. During drought, social support from family and friends, maintaining social connections and social capital, and the availability of health services to support health and wellbeing, enable community bonds, roots, and commitments to be formed, and are important elements of community resilience. Collaborative community programs can be used to strengthen community social networks, social capital, and communication of pathways to improve social connectedness and mental and physical health. Examples of successful community programs include community garden interventions which have been shown to improve social connectedness and mental and physical health.

Early recognition and effective response to poor mental health

Early recognition and effective response to poor mental health is likely to be effective in mitigating the impact of drought. Both Australian and international studies have recommended the engagement of rural health services in health promotion education and advocacy for the prevention and early intervention of poor mental health. It is recommended after-hours access, home visits, telephone and online services for counselling and advice to be made available to the local community. Rural financial counsellors and drought support workers are seen as accessible and significant supports and are an important gateway to health care. Mental health support services and counselling within schools and having access to mental health programs that have been adapted to rural settings are recommended services and programs to support young people during drought.

Mapping government funded program outcomes against resiliency and vulnerability frameworks

In Western Australia, \$28 million dollars has been allocated to local activities and projects to support rural communities. It is recommended all funded activities, projects and programs have outcomes

frameworks which are in line with the outcomes presented in the resiliency and vulnerability frameworks presented in this report.

This report gives domain measures of social structure, social capital, social mechanisms, social equity and diversity and social beliefs which can be used in a community resilient measurement framework. Indicators have also been given for the factors within the social and economic dimensions of drought vulnerability. Where possible, local indicators need to be sourced and matched to each domain and factor.

1. INTRODUCTION

The 'Understanding the social impact of drought' report provides a comprehensive review of the international and Australian evidence around the social impacts of drought and factors which may mitigate the adverse social impacts. This review also explores the factors which make a community more resilient to drought, and factors which make a community more vulnerable to drought. Different models have been presented along with social frameworks which can be used to measure resiliency and vulnerability to drought within a community.

1.1 Purpose

By reviewing the evidence base this report aims to answer the following questions outlined below:

1. What are the social impacts of drought?
2. What factors make a community more resilient to drought? How might these factors be measured to assess resiliency and evaluate the success of interventions. What are the key responses, initiatives and programs that may mitigate the adverse social impacts of drought?
3. What factors make a community more vulnerable to drought? How might these factors be measured to assess vulnerability and evaluate the success of interventions?

1.2 Methods

An integrative review methodology was used to assess, critique and synthesise the literature on drought, social impact, resiliency and vulnerability. This report was informed by a comprehensive review of 155 peer reviewed articles, books and other published text in the 'grey literature' produced by both government and non-government organisations.

Interestingly, the vast majority of the work to date in the area of drought is Australian based, followed by Africa and South America.

1.3 Structure of the report

The *Understanding the social impact of drought* report is structured as follows:

Chapter 1: Introduction

Chapter 1 presents the research questions, the research methodology, and the structure of the report.

Chapter 2: The social impacts of drought

Chapter 2 presents the social impact of drought in regional and remote areas. The relationship between direct and indirect impacts of economic factors on social outcomes such as out-migration, employment, health and wellbeing, family relationships, mistrust of government, uncertainty over the future, community resources and service and support systems are examined in detail. Recommended elements of successful national and international programs are also described, and the government response measures to drought have been listed. Highlight boxes of vulnerable groups (women, men, young people, older people, Aboriginal Australians) describe the specific issues these groups face during drought.

Chapter 3: Resilient communities

This chapter collates information on individual and community resiliency factors which are both essential to managing drought in rural communities. Focus has been put on factors influencing resilience within Australian farming communities and coping strategies used at both the individual

and community levels to mitigate the impact of drought. A social framework involving adaptive capacities has been presented as it allows operationalisation for measuring social resilience in communities impacted by drought.

Chapter 4: Drought vulnerability

Chapter 4 explores the relationship between the resiliency and the vulnerability of a community affected by drought. The interactions between drought risk and vulnerability, who is most vulnerable and their needs and adaptive capacity to cope, are important aspects of drought mitigation. Dimensions related to social, economic, physical, crime and conflict, governance, environment and farming practice are important areas to be measured as part of a vulnerability assessment and are presented as a measurement framework of dimensions, factors and indicators which can be applied to a community impacted by drought. Drought risk reduction and adaptation strategies form the basis of many drought mitigation plans. This chapter presents drought risk reduction and adaptation options at the individual, government, and eco-system level.

Chapter 5: Transition roadmap

A transition roadmap has been developed for building resilience to the social impact of drought in Chapter 5. The chapter presents a roadmap based on the resilience literature and includes four stages: infrastructure; governance; population retention; and social capital.

Chapter 6: Recommendations

This chapter concludes the report with a short summary on the findings on the social impact of drought and what makes a community more resilient and less vulnerable to drought. Recommendations have been made to mitigate the social impact of drought in rural communities.

Social impacts of drought and methods to increase community resilience are neatly illustrated in the following figure.



Source: Will Bessen, Tuna Blue, TWG April 2022

2. THE SOCIAL IMPACTS OF DROUGHT

Regional and remote areas are associated with higher levels of life satisfaction and community support due to increased community interconnectedness, social cohesion, and higher levels of community participation and volunteering (Ziersch et al., 2009). However, drought in regional and remote areas impacts on many social outcomes. From a social impact perspective, drought is conceptualised as a socio-economic phenomenon rather than a lack of precipitation alone. The emphasis is on the impact that a lack of precipitation has on human activities at the individual, household, and community level.

Overall, research evidence suggests the primary driver by which drought affects social outcomes is through the effect on economic outcomes (Edwards et al., 2019). But drought itself also directly impinges on social outcomes and there are significant indirect economic consequences from the various first-round social consequences. Economic factors affect both the local and broader economies, with the more severe the drought, the larger the effect on both the social and economic outcomes of farmers (Edwards et al., 2019). Indirect economic factors which impact on social outcomes include hardship and stress of lost productivity, a declining population, disruption of social connections, a loss of services to the local community, and trauma associated with witnessing damage to livestock, crops, soil and native vegetation (Berry et al., 2008; Edwards et al., 2019). The impact of long term drought can be measured not only in loss of stock and depletion of resources, but also in deterioration of family relationships, loss of community networks, feelings of uncertainty for the future and feelings of being abandoned by the rest of Australia (Stehlik et al., 2000).

This chapter outlines the social impacts of drought which result from direct and indirect economic factors.

2.1 *Employment/financial constraints*

The impacts of drought on employment in rural and regional communities, and the effect on local communities, has been described as being hard to fully quantify (Aslin & Russell, 2008). Drought has been described as causing 'substantially lower' employment, with communities affected by drought taking many years to make a significant recovery (Aslin & Russell, 2008). Declines in employment and job losses are particularly felt in the following rural industries: horticulture and fruit growing; grain; sheep and cattle; cotton; services to agriculture; and dairy cattle farming.

Employment becomes affected by drought due to the inability to afford labour (Alston & Kent, 2004). In one study, drought had caused 20% of farmers to take work off-farm, often creating stress for family members due to increasing workloads (Stehlik et al., 1999). Increased or changing workloads can be experienced by all family members during drought: men having to do more physically demanding jobs as they are unable to hire labour; women taking off-farm jobs or coming back to work on farms, taking over farm administrative duties, minding and educating children; older people to provide child care for working parents; young people often have a 'stolen childhood' taking on adult roles with increased work-loads (Alston & Kent, 2004).

Businesses are impacted in the local community due to locals not earning and spending money, a downturn of visitors, and a lack of seasonal work resulting in less spending in the community generally and fewer people needing accommodation (Alston & Kent, 2004; Aslin & Russell, 2008).

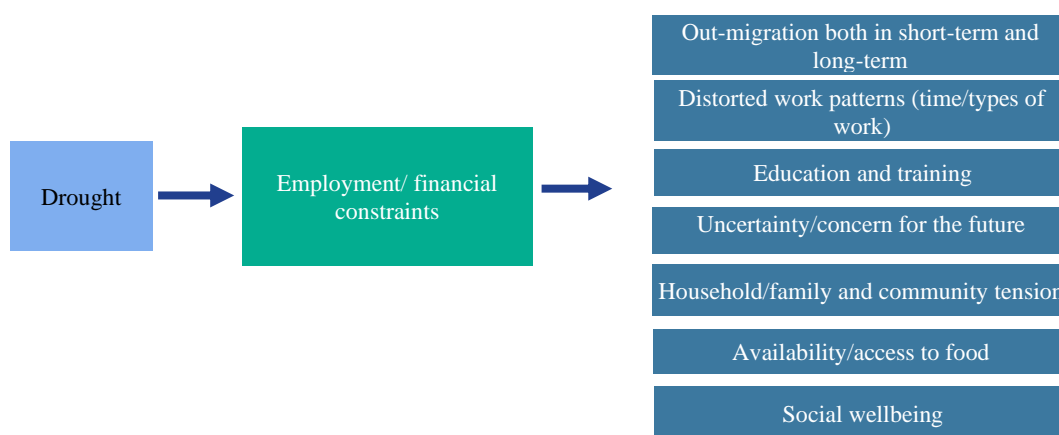
As businesses in the community are impacted by drought, staffing levels change through redundancies, moving staff from fulltime to casual, eliminating casual work, and modifying staff hours (Aslin & Russell, 2008). Young people are impacted by the lack of apprenticeships, casual positions, and job opportunities (Alston & Kent, 2004). They also show concern with the increased financial pressure on their families (Alston & Kent, 2004; Carnie et al., 2011). With out-migration, communities are left with a skills shortage which becomes a major issue for employers in the area after the drought breaks (Aslin & Russell, 2008).

In times of drought, older people report feeling loss in many areas including business profitability and professional success (Polain et al., 2011). The unequal distribution of drought-related financial support within a community can polarize, especially in the case of prolonged drought (Carnie et al., 2011).

Drought is synonymous with loss of income in rural and regional communities. The loss of income, high costs associated with farm production, and the loss of employment opportunities create significant hardship and may result in poverty (Alston, 2007; Alston & Kent, 2004; Stehlik et al., 1999). Many farmers accumulate long term debt during drought as a result of feed costs and low or no production (Carnie et al., 2011). Eligibility restrictions and complicated processes make it difficult for those with little or no income to seek income support through Centrelink, leading to financial stress (Alston, 2007). The demand on charitable organisations during drought has been described as 'extreme' with some families reliant on charities for their survival (Alston, 2007).

Analysis of 5000 respondents within the HILDA survey, a nationally representative panel survey of Australian adults aged 15 years and over, found exposure to drought exacerbated the relationship between food and mental health via potential negative impacts on the availability, livelihoods, food price and consumption of nutritious food (Friel et al., 2014). The volume and nutritional quality of food consumed during different types of drought was significantly related to levels of distress (Friel et al., 2014). The types of drought were described as 'constant' (in drought for an extreme number of months), 'long dry' (experienced both constant drought of many months and a recent long period of unbroken dryness that developed into drought), 'very dry' (during drought the relative level of dryness is intensely dry), and 'very long dry' (in relative dryness for long unbroken period in the last two years) (Friel et al., 2014). This study found people from rural areas who had experienced constant and long dry were more likely to regularly consume below-average levels of core foods (from the five main food groups) than those experiencing only very dry or very long dry (Friel et al., 2014).

Figure 1 Impacts of drought through employment/financial constraints



2.2 Out-migration

Many studies have shown that drought impacts individuals, families and communities through both short-term and long-term out-migration. The loss of income during drought may cause families to seek off-farm income through paid work, with men moving out of town looking for work and women moving to towns for off-farm employment (Alston & Kent, 2004). For many women, drought has led to them seeking off-farm work to pay for school fees and to ensure their children can remain in current schooling (Alston & Kent, 2004). Conversely, working women have had return to the farm fulltime due to the inability to afford labour during drought.

Women

Rural women value their identity: being responsible, self-reliant, organised, physically and mentally strong, positive, competent, caring and supportive (Harvey, 2007). Women may experience the stresses and hardships caused by drought differently than men: many women found their roles changed, employment changes, managing farm budgets, and taking care of the education and wellbeing of children (Alston, 1995, 2007; Alston & Kent, 2004) (Casey et al., 2021) (Rich et al., 2018). While some have made an economic contribution through additional farm labour, others have had to find or create off-farm work to support farm incomes (Casey et al., 2021). Conversely, other women have had to forego paying jobs in town to provide much needed cost-saving labour on farms (Alston, 1995).

The off-farm paid work often ensures that partners can continue to farm but undertaking work off-farm results not only in role changes, but also in daily routines which in turn affected their families with sacrifices being made with jobs on the farm given preference to jobs within the home (Lansbury Hall & Crosby, 2022; Stehlik et al., 2000). Work off-farm is used to supplement farm incomes to help pay for the family's ongoing needs and to support their children's education, ensuring their children can remain in childcare, school, boarding schools and at university (Alston, 2006; Aslin & Russell, 2008; Boetto & McKinnon, 2013; Greenhill et al., 2009). Drought usually increases the debt load of the farm which may mean women may need to continue off-farm work after the drought has broken and never return to the farm full-time (Alston, 2006).

During drought many women who have had farm business book-keeping roles find their roles extended to farm financial management. Being the first point of contact with stock agents and bank managers can be a source of stress (Alston, 2006; Stehlik et al., 2000). Drought duration is associated with higher distress in younger rural women (aged 40–54); supporting younger women and understanding ways older Australian rural women cope is important in understanding how to build adaptive capacity and resilience (Hanigan et al., 2018).

Some women find working off-farm stressful, while others found contributing financially to the family positively impacted on their self-esteem, self-help and self-reliance (Stehlik et al., 2000). This new-found independence together with gendered role expectations can put stress on relationships (Alston, 2006).

The responsibility for the provision of welfare support for their families can compromise women's health (Alston, 2006). To counteract the stress of drought, some women turned to their garden as an antithesis of drought, describing it as a place of water, serenity and greenness (Alston, 2006; Stehlik et al., 2000). The 'sense of wholeness derived from a personal connection and sense of intimacy with the land' has a positive influence on health and wellbeing (Harvey, 2007). However, if women were unable to maintain their gardens due to water diversion, gardens became a place of sadness and loss and impacted their psychological health (Stehlik et al., 1999; Stehlik et al., 2000).

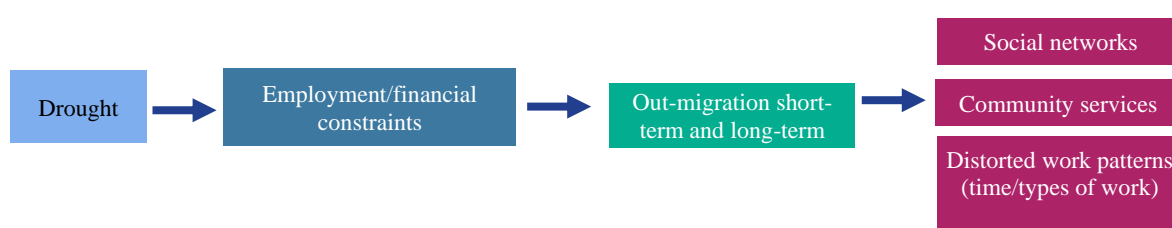
The long-term impact of the drought can affect the nature of women's' relationships to their community. The loss of neighbours through out-migration, closure of community stores and services, the lack of opportunities to share feelings and experiences with others who had similar personal social and cultural experiences, and feelings of isolation impact on women's health and wellbeing (Harvey, 2007; Stehlik et al., 2000). Consequences range from feeling sad and experiencing psycho-social distress to hospitalisation (Harvey, 2007). Women are more likely to hide their levels of stress from their partners and family, take on the responsibility of being the emotional support for their family, placing their own health and wellbeing as a low priority (Alston & Kent, 2004; Stehlik et al., 1999).

The availability of a local and supportive female GP, and the ability to seek help outside their community is important in addressing the need for emotional support (Harvey, 2007). Women have been constrained from seeking help when they feel they didn't fit in with rural social and cultural norms and felt marginalised and excluded (Alston, 2007; Harvey, 2007).

Young people are actively encouraged by family to live elsewhere and migrate out of the area (Alston & Kent, 2004). Distress levels for older adolescents are more affected by loss of friends from the area than younger adolescents, and they worry about the future of their communities as businesses and services close due to families leaving the area (Dean & Stain, 2010).

The out-migration of men, women, family members, young people and workers from rural communities leads to a loss of social capital and a reduction in social activities and community groups, impacting on the cohesion of rural communities (Alston & Kent, 2004; Edwards et al., 2008; Stehlik et al., 1999). Older people report feeling loss in many areas including relationships with people moving away, and report concern at the lack of happy, positive local role models and mentors for young people (Alston & Kent, 2004; Polain et al., 2011).

Figure 2 Impacts of drought through out-migration



2.3 Education and training

Education and training have been described as ‘essential’ to the social and economic wellbeing, resilience and adaptive capacities of communities (Aslin & Russell, 2008; Australian National Training, 2003), with levels of education and training indicators of living standards, quality of life, social inclusion and social disadvantage (DEST, 2004; Sciences, 2008). Increased workforce opportunities is a key factor in social inclusion and quality of life (DEEWR, 2008), particularly for those who are disadvantaged through geographic isolation (DEST, 2004; Sciences, 2008). For rural communities, education and training ensures that there is an ongoing supply of adequately skilled and productive labour (ANTA, 2004; BTRE, 2006; DEEWR, 2008; Sciences, 2008) and is a key factor in building inclusive, prosperous and sustainable communities (ANTA, 2003; DEEWR, 2008; DEST, 2004; Sciences, 2008).

The impact on access to education on children and young people is significant for all levels of schooling: preschool, primary school, secondary school, vocation training and university (Alston & Kent, 2008). Access to education is cited as a significant financial pressure for farm families, with parents concerned about not being able to provide the level of financial support they had planned for their children’s education (Aslin & Russell, 2008; Sartore et al., 2008). Parents report reducing their children’s days at preschool to reduce education costs, finding it difficult to pay boarding school fees, and being unable to support their children through university (Alston & Kent, 2004).

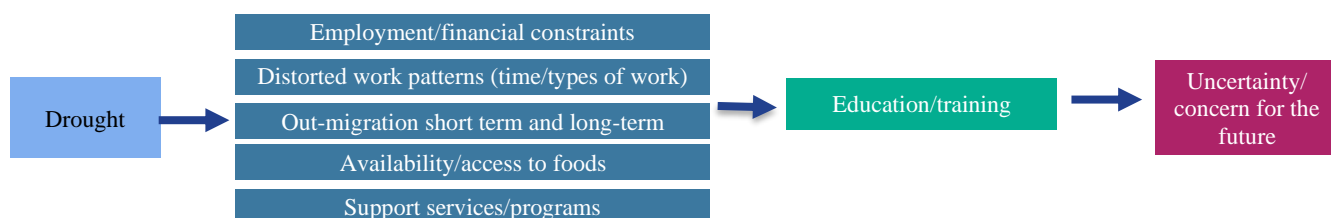
During times of drought, many children and young people need to work long hours at home or on the family business and assist with farm labour tasks, requiring School of the Air or home-schooling education, resulting in missing schooling and withdrawing from school or TAFE/University (Alston & Kent, 2004; Aslin & Russell, 2008; Boetto & McKinnon, 2013; Sartore et al., 2008). As a consequence of withdrawing from school to work at home or on the family business, future opportunities for employment and making friends are lost (Carnie et al., 2011). Out-migration also impacts on education with the lack of residents resulting in the closure of small local schools and the loss of transport to and from school (ICPA, 1999).

Due to increasing poverty and lack of access to food during drought, some children were found to be going to school hungry, highlighting the need to provide a breakfast program to encourage attendance, and to limit behavioural problems (Alston & Kent, 2008). Indigenous students and parents report problems during times of drought associated with access to literacy and numeracy classes and problems with absenteeism (Alston & Kent, 2008). Children with special needs in

remote areas require support services and programs, respite care, and home tutors to support educational needs (Alston & Kent, 2008).

The specific impacts on primary, secondary and tertiary education are discussed further below.

Figure 3 Impacts of drought on education and training



Primary school

Many rural and remote children participate in home-schooling or distance education. Both these forms of education require a tutor (usually the mother) to help teach the children and is therefore dependent on a mother's time and ability to teach the lessons (Alston & Kent, 2008). Many mothers report stress associated with increased property responsibility and workloads, and responsibilities towards educating their children, reporting children were spending more time alone doing their schooling. (Aslin & Russell, 2008; Sartore et al., 2008).

Secondary school

Most rural and remote families send their children away for high school because of their distance from town (Alston & Kent, 2008). During drought, many high schools experience a drop in enrolments due to out migration and families leaving the area (Aslin & Russell, 2008). Reductions in enrolments affect teacher numbers, which in turn impacts on the availability of subjects offered resulting in students taking more distant education (Alston & Kent, 2008). Due to drought impacting on poverty levels, many families are also unable to fund extracurricular activities, or support young people in participating in representative events (Alston & Kent, 2008).

Young people also report the stress of not being able to pursue an education. A study of Australian women's experience of drought described a case study involving a young woman who had hoped to complete a university education; this young woman reported on the strain on her family in terms of workload and finances if she were to attend university (Alston, 2006).

High school retention rates have been dropping with rural and remote young people not wanting to put financial stress on their parents, or be a financial burden (Alston, 2006). Alston and Kent (2008) reported that there was evidence to support the contention that high school retention rates have been dropping for rural and remote young people.

Boarding school

Many young people in rural and remote areas need to attend boarding school for their high school years due to distance and lack of access to secondary education locally. Young people who attended boarding school reported that distance from their families increased their stress, and worried whether their parents could afford the time or money to keep them on at school (Alston & Kent, 2004; Aslin & Russell, 2008).

Due to financial difficulties during times of drought, parents report difficulties in paying tuition and boarding fees, being unable to visit their children regularly, being unable to send younger children to boarding school, or sending children away at a later age (Alston, 2006). While boarding schools try to

help accommodate rural and remote families during financial stress, delayed payment schemes result in a reduced ability to support their children at a tertiary level, with some parents encouraging their children not to attend tertiary level education for financial reasons (Alston, 2006).

Young people

The impact of drought on young people is far reaching: affecting education, employment, physical, emotional, and mental wellbeing.

Young people often have a 'stolen childhood' taking on adult roles with increased workloads, and face increased risk of physical injury when having to leave school to work at home or on the family business (Carnie et al., 2011).

Increased work-loads, financial constraints, the lack of public transport and out-migration, limit young people's access to secondary school, boarding school, vocation training and university educations, causing stress (Alston, 2006). Out-migration also causes loss of friends and worry about the future of their communities (Dean & Stain, 2010). Young people are also impacted by the lack of apprenticeships, casual positions, and job opportunities (Alston & Kent, 2004).

Young people are resilient to drought for a time but, with prolonged exposure, start to exhibit increased distress, hopelessness and behavioural problems which challenge their resilience (Carnie et al., 2011; Dean & Stain, 2010). Young people experiencing drought mainly worry about family, friends, community, money and the future [4]. Altered family dynamics and decreased time and opportunities for interacting with others mean many young people are having to deal with increasing social isolation (Alston & Kent, 2004; Carnie et al., 2011). They report feeling overwhelmed, wanting help for their immediate worries from trust worthy support people who understand drought and rural circumstances (Carnie et al., 2011).

Young people have expressed the need for co-ordinated mental health support services within schools, and having access to mental health programs that have been adapted to rural settings (Carnie et al., 2011). Young people seek schools working together, more information about mental health, and where to seek help for them and their friends (Carnie et al., 2011).

TAFE/University

The need for young people in rural and remote areas to travel long distances for TAFE training limits their access to education. Specifically, the cost of travel, lack of public transport and reliance on parents and others for transport limits the opportunities to access TAFE courses (Alston, 2006). Many rural and remote young people report cost being a barrier to TAFE education, including the inability to access a Youth Allowance or a living away from home allowance (Alston, 2006).

Access to TAFE education may also be limited due to migration of young people out of the area, with a reduction in numbers resulting in decreasing services and a lack of access to TAFE campuses (Alston, 2006; Alston & Kent, 2004). TAFE, requiring minimal student numbers for some courses, leave many young people unable to study when courses are withdrawn (Alston & Kent, 2004). Young people who left school early are less likely to find an apprenticeship or traineeship during drought, and those that remained in their communities were likely to experience significant unemployment and underemployment due to the lack of available jobs (Alston, 2006).

Rural and remote young people who attend university primarily cite financial aspects as a barrier to accessing tertiary education (Alston, 2006). The financial cost of attending university includes the need to move away from home, with many families being unable to support their young people away from home. Young people are often not eligible for the Youth Allowance as a result of means testing on parental assets (i.e., farming parents may be asset rich and income poor) (Alston, 2006). Due to the lack of availability of work in rural and remote communities, or the work available being part-time

or seasonal, young people are not able to find work to support themselves (Alston, 2006). Financial concerns and pressure may also result in delaying university entry, giving up university places, dropping out of courses, choosing shorter courses, needing to work to try and support themselves during study, and choosing a regional university over a city university due to the cheaper costs of living (Alston, 2006). Young people report that having to work to support themselves has resulted in poorer grades and less opportunities to return home to visit family (Alston, 2006).

2.4 Health and Wellbeing

While indirect and complex relationships may make it difficult to measure with any precision how drought affects human health, the location and intensity of the drought and the infrastructure and preparedness of exposed communities can mitigate the impact on health (Goss, 2008).

Extreme weather events such as drought can impact on physical and social wellbeing; trigger loss and trauma during and immediately after the events; exacerbate existing stress and other mental health issues; impact on livelihoods and affect finances, employment and income; enact post-event trauma; and cause uncertainty and concern for the future (Lansbury Hall & Crosby, 2022).

Physical wellbeing

The relationship between drought and physical wellbeing outcomes differs temporally (duration, frequency and magnitude), spatially (locations and communities), and according to drought type (meteorological and agricultural) (Austin et al., 2021). Exposure to prolonged high temperatures, which can co-occur with drought, promotes physiological changes (Aslin & Russell, 2008). In one study, over one-third of people affected by drought reported some effect on their health - 3% reported an extensive impact - and 18% reported some effect on their children's health (Stehlik et al., 1999). People in rural areas have higher rates of chronic diseases and pre-existing health risk factors like obesity and smoking, which consequently make them more susceptible to the impact of drought (Aslin & Russell, 2008).

Drought has a substantial negative health impact on individuals, families, and community members (Edwards et al., 2019). Impacts on health include increased:

- Mortality (Berman et al., 2017; Lynch et al., 2020; Salvador et al., 2019);
- Tiredness and exhaustion (Alston & Kent, 2004);
- Respiratory-related disease including asthma, respiratory allergies, and airway disease. These are exacerbated from worsening air quality, increased amounts of airborne dust and particulate air pollution (Salvador et al., 2019; Smith et al., 2014; Stanke et al., 2013; Wang et al., 2017);
- Diseases relating from poor hygiene due to the in availability of fresh water (Aslin & Russell, 2008; Edwards et al., 2008; Vins et al., 2015);
- Use of prescription medications (Edwards et al., 2019);
- Hazardous drinking (Edwards et al., 2019);
- Water and vector borne infection (Aslin & Russell, 2008; Brown et al., 2014; Stanke et al., 2013); and
- Cardiovascular events (Aslin & Russell, 2008; Berman et al., 2017).

In many cases, drought results in an increase in workloads on family members and impacts on tiredness and exhaustion. Normal workloads associated with running a property continue during drought with the addition of carting water due to low water levels, tending to drought affected livestock, and dealing with environmental issues such as dust storms and lack of ground cover (Alston & Kent, 2004). Due to financial constraints, older farmers who are unable to pay hired labour, work longer days on properties, with the accompanying physical strain and exhaustion, ultimately affecting their wellbeing (Alston & Kent, 2004).

During various roundtable interactions, members reported that extreme drought may not always lead to increased workloads per se but a significant reduction in time spent on the usual routines of the

farm and the transfer of time into work routines associated with mitigating the adverse effects of drought. Changed patterns of work as opposed to increased workloads in itself may have as serious deleterious impacts on physical and mental health as an increase in workloads.

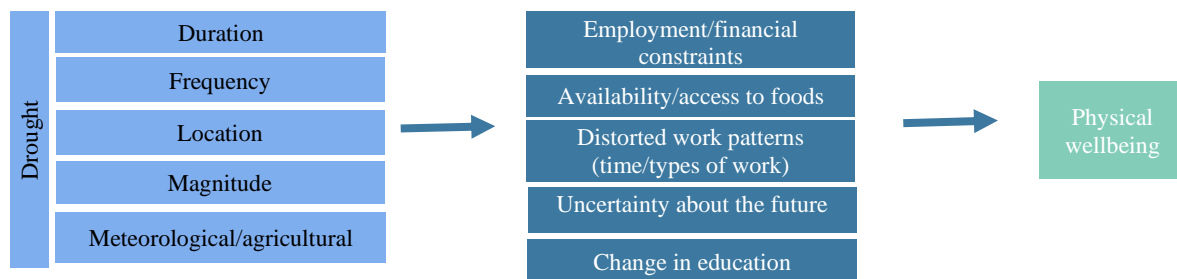
Anxiety over the future can lead to sleep disturbance, high blood pressure and heavy drinking (Alston & Kent, 2004). One study found the use of prescription medication was 8 times higher when productivity was extremely adversely affected by drought and 4 times higher when productivity was substantially affected by drought (Edwards et al., 2019).

The availability of and access to food may be limited due to financial constraints which impact on individual physical and mental wellbeing (Friel et al., 2014).

Children and young people face increased risk of physical injury when having to leave school to work at home or on the family business (Carnie et al., 2011). Young people are also at an increased risk of harm or abuse, being exposed to increased domestic violence (Alston & Kent, 2004). Parents' excessive alcohol consumption and parents' reluctance to seek help also places young people at increased risk of harm (Alston & Kent, 2004).

Adults report during times of drought they worry about their children misusing drugs and alcohol, experiencing sexual health problems, homelessness, teenage pregnancy, problems with the law and physical safety (Alston & Kent, 2004).

Figure 4 Impacts of drought on physical wellbeing



Aboriginal Australians

Aboriginal Australians are likely to be disproportionately affected by drought on the basis of pre-existing health and social disadvantage (Stehlik et al., 1999). The health status of Aboriginal Australians is lower than that of the general Australian population, being more likely to have a disability or a chronic disease and a significantly lower life expectancy (AIHW, 2018; Rich et al., 2018). Remote and very remote communities are particularly vulnerable. In these communities, Aboriginal Australians' health status is even poorer, and increases vulnerability to drought (AIHW, 2018).

Prolonged drought impacts on the availability of work, and the degradation of the landscape which affects the ability to carry out cultural roles that support cultural identity (such as caring for country), impacting on mental, emotional and physical wellbeing (AIHW, 2018; Lansbury Hall & Crosby, 2022; Rigby et al., 2011). The loss of identity associated with the inability to carry out cultural roles is highly correlated with increased rates of substance use and dependency, violence, and suicide (AIHW, 2018; Rigby et al., 2011; Townsend et al., 2009; Veland et al., 2013).

During prolonged drought, Aboriginal Australians experience solastalgia, a feeling of psychological desolation caused by the recognition that one's home is under physical threat, eroding a sense of belonging (Albrecht, 2005).

Adaptive capacity and resilience to drought may be impacted by inadequate infrastructure and health services, and also by social disadvantage (Lynch et al., 2020). However, Aboriginal ecological knowledge can offer adaptive solutions for land management and adaptation strategies, with utilisation providing local empowerment that can address health prevention, cultural, and social needs (Green & Minchin, 2014).

Drought interventions for Aboriginal communities must be targeted and involve co-ordinated partnerships with Aboriginal Community Controlled Organisations and related health services (Horton et al., 2010). Mental health services need to have a focus on social connectedness and support, particularly for anyone facing relocation (Horton et al., 2010). Aboriginal people need a wider range of support services at a younger age than non-Aboriginal people (Horton et al., 2010).

Mental wellbeing

Drought is a financial crisis impacting on the whole family that results in psychological distress, worsened mental health, higher mortality among people with pre-existing mental health conditions, increased psychiatric hospitalisations, and heightened suicide rates (Charlson et al., 2021; Stehlik et al., 1999; Vins et al., 2015). It is estimated that if a population were not exposed to drought, the overall incidence of mental health problems in rural and regional areas would be 10.5% lower (Edwards et al., 2015). Where productivity had been reduced to the lowest point ever, the odds of having a mental health problem were eight and a half times higher than the population compared to four times higher among farmers where productivity was only substantially reduced by drought (Edwards et al., 2019).

The impact of drought is felt through feelings of fear, helplessness and futility, loss of control and mastery, as well as concerns for their families, future financial viability, the farm, and the local community (Albrecht, 2005; Alston & Kent, 2004; Sartore et al., 2008).

Chronic financial strain, family separation and social isolation can increase risk of mental health problems and lead to what has been described as a 'draining of strength and hope' (Fraser et al., 2005; Sartore et al., 2008). Previous studies have found associations with poor mental wellbeing that vary by age, gender and geographical remoteness, with the level of the impact related to the vulnerability and resilience of the community (Aslin & Russell, 2008; Hanigan et al., 2018). Rural communities lacking in mental health resources and opportunities for intervention, may not be able to cope with an increased risk of psychiatric morbidity (Sartore et al., 2008).

Trauma associated with drought can manifest as anxiety, depression, aggression, and chronic psychological distress that can lead to an increased risk of suicide (Smith et al. 2014) (Smith et al., 2014). Financial instability can lead to feelings of burden or inadequacy that are a consistent risk factor for suicidal thoughts and behaviours (Van Orden et al., 2010).

Stress

During drought, stress is evident among men, women and children (Alston & Kent, 2004). Both personal and community drought related stress are reported by many experiencing drought (Austin et al., 2021) (Charlson et al., 2021). Economic pressures, business pressures, government compliance pressures, loss of social interactions and social networks, increased workloads, close work relationship in families, roles combining farm and family responsibilities, the availability and access to food, less time for family, seasonal variations in work patterns, and physical isolation all contribute to personal drought related stress (Aslin & Russell, 2008; Austin et al., 2021; Friel et al., 2014; Polain et al., 2011; Slee, 1988; Stehlik et al., 1999). Severity of drought is significantly associated with financial stress (Edwards et al., 2019).

Out-migration, loss of services, difficulties accessing mental health support or receiving inappropriate mental health services, lack of community interaction, a changing landscape, and reduced water quality also contribute to community drought-related stress (Austin et al., 2021; Polain et al., 2011; Stehlik et al., 1999).

The mental health of farming families is influenced by their emotional connection to the land and the financial stress of farming (Dean & Stain, 2010). Nostalgia is defined as the distress caused by the transformation of drought affected land. It refers to a feeling of psychological desolation caused by the recognition that one's home is under physical desolation, eroding a sense of belonging (Albrecht, 2005). Drought may cause a lack of connection to the land, disconnection and possibly displacement from place due to the changes in the countryside (Albrecht, 2005; Austin et al., 2021; Austin et al., 2020). The more severe the drought, the higher the adverse effects on farmer mental health (Edwards et al., 2015), with duration impacting most on younger, less experienced farmers with financial hardship (Austin et al., 2018) and young women (Hanigan et al., 2018). Patterns of drought also have an impact with one study showing a pattern of drought lasting a year or more associated with increased distress, and those experiencing constant and recent long drought patterns were more likely to experience moderate distress and increased risk of future mental health issues (O'Brien et al., 2014). However, suicide risk during drought differs by gender with risks being higher for men (Hanigan et al., 2012).

In a systematic review of risk factors affecting farmers' mental health, Daghard Yazd et al. (2019) reported studies finding chronic stress leading to physical problems (including headaches, tiredness, sleep problems, weight change, loss of appetite, relaxation problems), mental problems (including anxiety, anger, depression, loss of control, loss of self-esteem), cognitive issues (including memory loss, inability to make decisions), social problems (including withdrawal from social activities, relationship breakdowns), and substance abuse which could lead to burnout and exhaustion (Daghagh Yazd et al., 2019b). They are also concerned with risks to their children and young people of harm, abuse, homelessness, problems with the law and constrained opportunities (Carnie et al., 2011).

Financial constraints which may limit the availability of and access to food impacts on individual mental wellbeing (Friel et al., 2014). People exposed to drought and missing meals due to cost reported higher psychological distress than those not missing meals. In most drought categories, people consuming higher-than-average discretionary food levels (high in fats, salt and simple sugars) reported higher levels of distress (Friel et al., 2014).

Stress and little or no income results in an increase in social isolation, particularly among men (Alston & Kent, 2004). Women are more likely to hide their levels of stress from their partners and family, take on the responsibility of being the emotional support for their family and place their own health and wellbeing as a low priority (Alston & Kent, 2004).

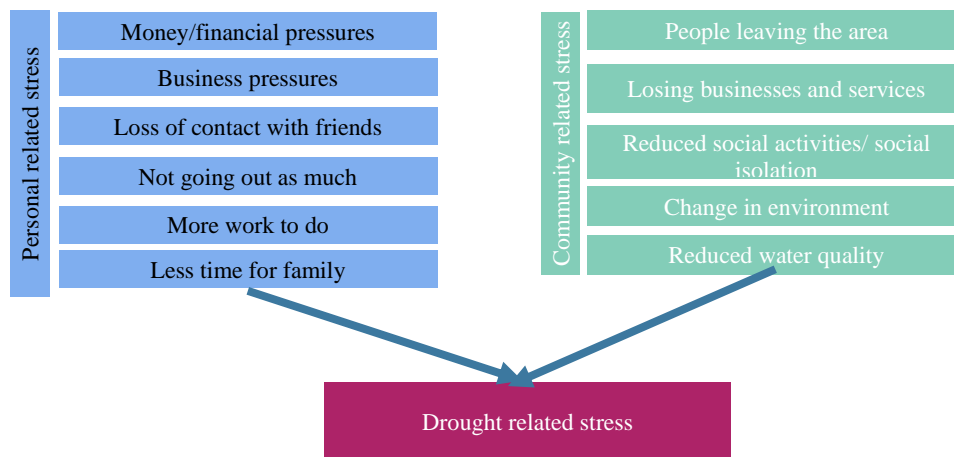
In drought, young people are surrounded by stress as they witness the stress their parents suffer (Alston & Kent, 2004). Young people are resilient to drought for a time but, with prolonged exposure, start to exhibit increased distress, hopelessness and behavioural problems which challenge their resilience (Carnie et al., 2011; Dean & Stain, 2010). A qualitative study showed young people experiencing drought mainly worry about family, friends, community, money, and the future [4]. Those who were attending boarding school, reported distance from their families increased their stress, and they worried whether their parents could afford to keep them on at school, whether the farm would survive, and whether they needed to return home to help [4]. Young people worry about their parents' mental health and having extended family taking a larger caregiving role provided emotional support for families [4].

Young people are more likely to try to deal with their own levels of stress in isolation (Alston & Kent, 2004). In one study on the impact of drought on young people, young people experiencing drought reported significantly higher levels of emotional distress and behavioural difficulties when compared to the population, with 12% scoring in the clinical range (Dean & Stain, 2010). Higher levels of hyperactivity and problematic behaviour and peer relationships were associated with family concerns, financial stress, climate change, mental health impacts and a perceived environment of death and loss (Dean & Stain, 2010). This study also showed grief, loss, and the impacts of global climate change were impacting on emotional distress (Dean & Stain, 2010).

People experiencing drought report being 'overlooked' by the Australian government causing a growing sense of isolation, stress and mistrust (Alston, 2007). Mistrust of governments within the community arises from the difficulties with determining eligibility for benefits, the increasing number of regulations and government compliance requirements, and the lack of action on the part of politicians and representative bodies (Alston & Kent, 2004; Polain et al., 2011). Older farmers also interpreted the increasing number of regulations and government compliance requirements as evidence of community and government loss of trust in farmers, and describe being out of control in the face of government policies (Carnie et al., 2011; Harvey, 2007; Polain et al., 2011).

While many farmers find themselves ineligible for Centrelink payments, those who are eligible describe it as a lengthy process and a 'complicated nightmare', with many farm families turning to a rural financial counselling service instead (Alston, 2007). Increase in off-farm income results in some families becoming ineligible for Centrelink payments (Aslin & Russell, 2008).

Figure 5 Personal and community factors leading to drought related factors (Austin et al., 2018)



Depression

Many studies have shown associations with Australian rural communities experiencing drought and poor mental wellbeing such as suicide risk, depression and distress, with associations that vary by age, gender, remoteness and farmers and non-farmers (Albrecht et al., 2007; Edwards et al., 2015; Ellis & Albrecht, 2017; Friel et al., 2014; Hanigan et al., 2012; Hanigan et al., 2018; Nicholls et al., 2006; O'Brien et al., 2014). However, there are also studies showing a lack of association between depression and drought for certain rural cohorts, usually women (Kelly et al., 2011; Powers et al., 2015; Powers et al., 2012). The studies showing a lack of association between drought and mental wellbeing in women surmised personal predispositional factors such as an ability to be adaptable and cope were protective factors against poor mental wellbeing (Powers et al., 2015). Interaction with the community and social support were also shown to be protective against poor mental wellbeing (Alston, 2012; Kelly et al., 2011).

Drought is linked to poor mental health indirectly, through the impact of drought on physical wellbeing, finances, social isolation and loneliness, concern for the future, and feelings of chronic loss and failure. Drought's impacts on farm men include them spending longer hours and doing more physically demanding work on the farm as farm labour becomes unaffordable, having to seek off-farm income through off-farm employment, and being locked into farms because of the need to handfeed and water livestock (Alston, 2006; Alston & Kent, 2004). This, together with wives leaving the farm to find employment, and losing friends, family and colleagues through out-migration, results in a decrease in family cohesion and community networks and an increase in social isolation, loneliness, and depression among men (Alston, 2006; Alston & Witney-Soanes, 2008).

Men

Australian rural men have poorer health than urban men and are also less healthy than rural women (Alston, 2012). Rural men have higher rates of cardiovascular disease, and are more likely to die from injury and accidents than rural women (Alston, 2012). Many rural men have an unhealthy lifestyle and more readily adopt risky behaviours such as smoking and alcohol use (Alston, 2012; Alston & Witney-Soanes, 2008).

Drought impacts on farm men include them spending longer hours and doing more physically demanding work on the farm as farm labour becomes unaffordable, having to seek off-farm income through off-farm employment, and being locked into farms because of the need to handfeed and water livestock (Alston, 2006; Alston & Kent, 2004). This, together with wives leaving the farm to find employment, and losing friends, family and colleagues through out-migration, results in a decrease in family cohesion and community networks and an increase in social isolation, loneliness, and depression among men (Alston, 2006; Alston & Witney-Soanes, 2008).

The grief and loss over the death of livestock and farmland, loss of their farming lifestyle, lack of employment, uncertainty about the future, social isolation, out-migration, decline in production and land values, loss of services, a growing sense of entrapment and inability to cope, threats to their identity and masculinity, and ready access to firearms result in men being identified as being at increased risk of developing mental health issues, including depression and suicide (Alston, 2012; Alston & Witney-Soanes, 2008; Judd, Cooper, et al., 2006).

Men are more likely to withdraw from their community than women, and are more reluctant than women to seek help partly due to pride and the stigma of admitting to mental health issues (Alston, 2007; Alston & Kent, 2004; Alston & Witney-Soanes, 2008; Polain et al., 2011; Stehlik et al., 1999).

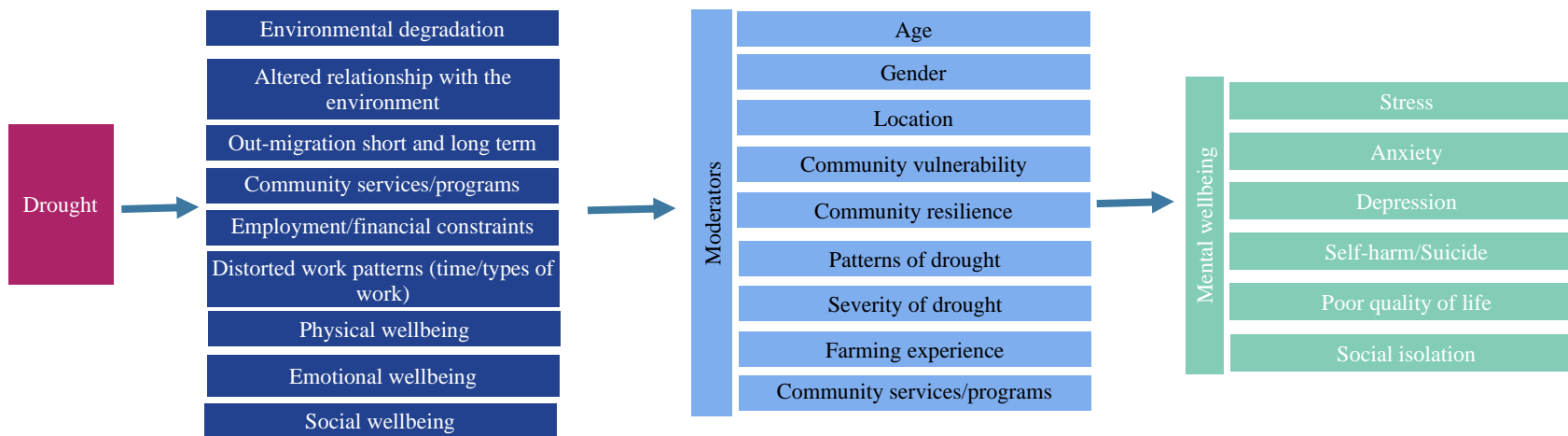
Suicide

Factors consistently associated with suicide are the presence of mental illness (most commonly depression) in association with factors such as social isolation, physical ill health, substance misuse and economic hardship (Judd, Jackson, et al., 2006). Climate variabilities or drought, pesticide exposure, financial difficulties and poor physical health/past injuries are the most-cited influences on farmers' mental health (Daghagh Yazd et al., 2019a, 2019b).

Rural and farming communities are at heightened risk of drought induced mental health impacts (Austin et al., 2018; Edwards et al., 2015; O'Brien et al., 2014; Vins et al., 2015), with high suicide rates one of the most serious concerns affecting rural and farming communities (Higginbotham et al., 2006; Rotgé et al., 2014). The rates of self-harm and suicide in Australia increase with remoteness, with those living in remote/very remote areas twice as likely to die by suicide compared to those living in major cities (Hanigan et al., 2012; Welfare, 2022). Explanatory factors for the increased rates of suicide in rural and remote areas include drought (Hanigan et al., 2018), financial circumstances (Taylor et al., 2005), social isolation (Hirsch, 2006), stigma of mental illness (Hirsch, 2006), mental disorders (Stain et al., 2011), and lower rates of mental health service access or utilisation (Taylor et al., 2005).

One study found the numbers of self-harm hospitalisations and suicide deaths were reduced by 5% through post-suicide attempt assertive aftercare, and community support programs in rural communities reduced self-harm hospitalisations by 3% and suicide deaths by 4% (Atkinson et al., 2020).

Figure 6 Impacts of drought on mental wellbeing



Psychological poverty

Psychological poverty is characterised not only by economic deprivation but also a disempowering lack of access to resources and services, an increase in workloads and a withdrawal from community (Alston, 2000; Alston & Kent, 2004). Psychological poverty is a poverty of the spirit, and is exacerbated during times of drought (Alston & Kent, 2004). Mistrust of governments and policy, contradictory expert advice, and believing that others do not understand the hardships being experienced (rural/urban divide) all contribute to psychological poverty (Alston & Kent, 2004; Stehlik et al., 1999).

Quality of life

Quality of life is also impacted by drought (Stehlik et al., 1999). Social activities, holidays and boarding school education are not classified as essential and are often impacted due to employment and financial constraints (Stehlik et al., 1999).

Social wellbeing

The decline in social networks has been described as one of the greatest challenges from drought, as social networks are an important component of rural communities (Stehlik et al., 1999). The number of families living and working on farms has been diminishing over many years, with detrimental effects on rural communities and availability of social networks (Horton et al., 2010). During drought, many families experience a decline in social networks primarily as a result of increased workloads, inability to leave the property because of feeding and water regimes, a decline in economic resources, and out-migration (Alston & Kent, 2004; Stehlik et al., 1999). The financial and emotional cost of going into town prevents farming families from maintaining social networks (Alston, 2007).

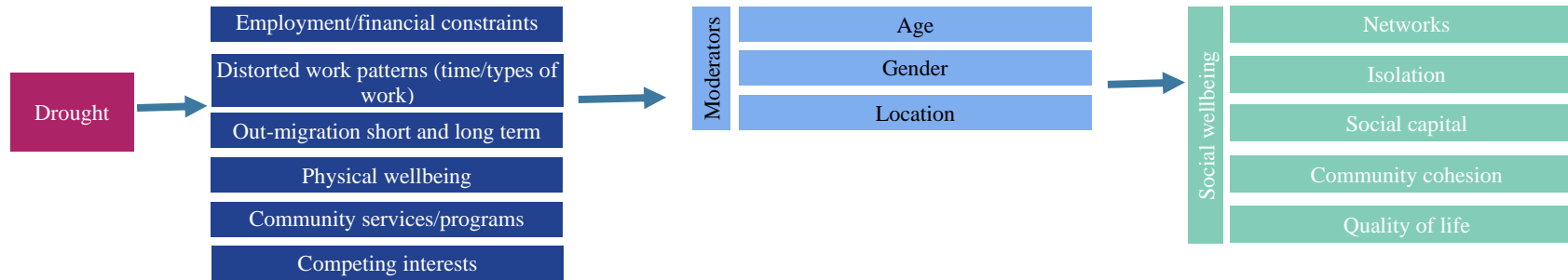
Research has found drought leaves decreased time and resources for interacting with others. The increased workloads and low incomes during drought place demands on family labour, draining time and energy and leaving little capacity to participate in family and community social events or building and maintaining social networks (Edwards et al., 2019; Stehlik et al., 1999). The loss of community status, social capital and social isolation impacts on many older community members, with many community groups going into recess as they struggle to find numbers (Alston, 2007; Polain et al., 2011). One study found that men were more likely to withdraw from their community than women (Alston, 2007).

Many rural families are geographically isolated from extended family, with transport costs and time associated with visiting family during drought making it more difficult to remain connected (Aslin & Russell, 2008).

Declining populations cause a sense of increasing isolation (Carnie et al., 2011) - the out-migration of people from rural communities leads to a loss of social capital, a reduction in social activities and community groups, and also impacts on the cohesion of rural communities (Alston & Kent, 2004; Edwards et al., 2008, 2019; Stehlik et al., 1999). Drought also impacts on the community's ability to come together in voluntary activities and makes it more difficult to attract volunteers to work in community organisations and schools, with organisations now having to pay people to fulfill volunteer positions (Alston & Kent, 2004).

Young people are having to deal with increasing social isolation, with some having to undertake home schooling, full-time work, and have the resulting limited opportunities for participation in community activities and no social outlet with others the same age (Alston & Kent, 2004; Carnie et al., 2011). Due to increasing workloads during drought, the number of times parents and families can visit their children during school or university is reduced, increasing separation of young people from their families (Alston & Kent, 2004).

Figure 7 Impacts of drought on social wellbeing



A positive outcome of drought on social wellbeing is the strengthened social cohesion that extends to the broader community and neighbours with people coming together to discuss drought related issues and solutions, with mutual sympathy and support; drought has been described as a ‘threat which prompts unusual feelings of belonging’ (Stehlik et al., 1999). The features of drought which have been described as fostering social cohesion include:

- social bonding based on a common threat with communities pulling together in the face of adversity;
- combatting the threat contributes to forming a rural identity; and
- disparate groups which have material interests which drought places in jeopardy find common ground (Edwards et al., 2008; Stehlik et al., 1999).

However, social interaction may also become problematic due to differentiation in interests becoming apparent between farm and town communities, leading to lower community social cohesion (Edwards et al., 2008; Stehlik et al., 1999). For example, the process of water management and privatisation of water organisations has previously created debate, tension, disharmony and increased conflict in rural communities (Alston & Kent, 2004; Aslin & Russell, 2008). However, studies have found that the negative impact of drought on community social cohesion may not have lasting effects (Edwards et al., 2008).

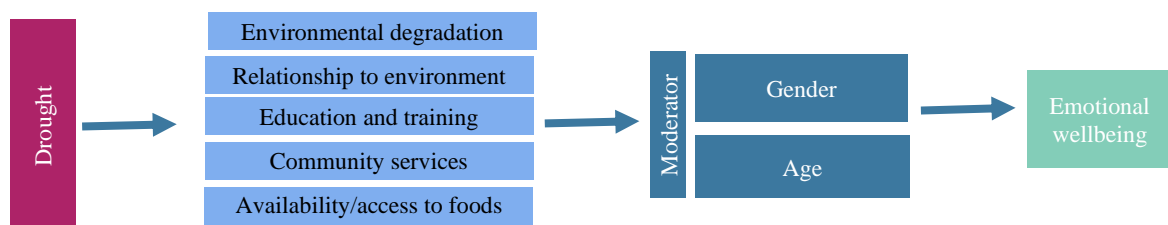
Emotional wellbeing

Drought undermines the traditional networks that have supported rural and remote communities, which are protective against poor social and emotional wellbeing (Dean & Stain, 2007). Drought impact on emotions differ by gender and age.

Men note environmental degradation, the altered relationship to their land, and the emotional trauma of watching the land and stock suffer (Alston & Kent, 2004). Women are more inclined to note the emotional impacts of loss of income on education, food and services, increased workloads and whether they would need to find employment elsewhere, changing roles, decreasing community involvement, and the impact on their families’ health (Stehlik et al., 1999). Women also refer to their gardens as an antithesis to drought - source of peace, serenity, water, greenness, which becomes a place of sadness when they are unable to maintain due to lack of water (Alston & Kent, 2004; Stehlik et al., 1999).

School teachers have introduced programs to provide support to children living with drought, as they have found children acting out their emotions at school (Alston, 2007).

Figure 8 Impacts of drought on emotional wellbeing



2.5 Family relationships

Couples whose partnership strengthened during drought were more likely to share decision making and report feeling less overwhelmed (Stehlik et al., 1999). Many men recognize the changing role of women and the vital role they play on the farm in maintaining properties (Stehlik et al., 1999).

Some studies report on the stresses of involuntary separation on family relationships including marital conflict, intra-family conflict, and intergenerational conflict (Alston & Kent, 2004; Stehlik et al., 1999), while others have found no evidence of negative impact of involuntary separation on family relationships, quality of the couple relationship, family functioning and family conflict (Edwards et al., 2008).

Impacts on children and young people include altered family dynamics and decreased time and opportunities for interacting with others (Alston & Kent, 2004; Carnie et al., 2011). Young people are also affected by relationship difficulties in their families causing them to worry about parents arguing or separating and divorcing (Alston & Kent, 2004).

It has been recommended that counselling support is needed when role changes between spouses occur, and welfare support provided during periods of involuntary separation (Alston & Kent, 2004; Stehlik et al., 1999).

2.6 Uncertainty and concern for the future

Drought impacts on the emotional, mental and physical health of older people, and also impacts on future plans for properties. Increasing debt means changes to future retirement plans and has consequences for succession planning (Alston & Kent, 2004).

Due to drought, succession plans may no longer be attractive or possible (Carnie et al., 2011). Young people worry about the uncertainty of their future and whether they will take over the family property (Alston & Kent, 2004; Carnie et al., 2011). Those young people who wished to stay to take over the family property, or own their own property, feel there is minimal support for them to do so (Alston & Kent, 2004). The loss of the next generation of potential farmers is one significant consequence of drought, requiring that support is provided for young people to continue to farm in these areas (Alston & Kent, 2004).

2.7 Community resources, services and support systems

During drought the service response has been described as 'patchy' and 'ad hoc' (Alston, 2007). Population decline in drought-affected communities with the number of families living and working on farms diminishing, negatively influences the availability of services (Edwards et al., 2019; Fraser et al., 2005; Horton et al., 2010). Drought is associated with higher rates of closures of key services: banks, schools, hospitals, and medical practices (Edwards et al., 2008, 2019). The downturn in businesses, loss of jobs and corresponding loss of services and professional positions has significant impacts on drought affected rural communities and service access and delivery (Alston & Kent, 2004; Stehlik et al., 1999). The reduced access to services is compounded by the difficulty in then attracting professionals, particularly allied health professionals, into rural communities (Alston & Kent, 2004).

There are already many barriers to accessing health care in rural and remote regions in Australia including not knowing service providers, a lack of health services, a lack of transport, and beliefs of compromising privacy (Stehlik et al., 1999; Wakerman et al., 2008). Many people are also reluctant to access services due to pride, the belief they need to be strong and appear stoic, the stigma and fear of being labelled 'crazy', the need to travel to access specialists, and the culturally inappropriate way services are delivered (Alston & Kent, 2004; Judd, Jackson, et al., 2006; Kirkwood & Peck, 1997; Polain et al., 2011). Farmers tend to seek help from financial counsellors and farming organisations, rather than health or social work authorities (Kirkwood & Peck, 1997).

In one study, while the majority of the rural community was aware a counselling service was available, only a small proportion of the community report using it, with respondents believing people are reluctant to ask for help (Stehlik et al., 1999). This same study found fewer men than women reported seeking counselling, while another study reports older farmers resist using mental health services (Polain et al., 2011; Stehlik et al., 1999).

A study into suicide in Australian farmers reported barriers to seeking help from formal health providers included both physical and attitudinal barriers: farmers had a preference to seek help from friends and family; they had limited acceptability of mental health care and stigma around mental

illness; and there is limited accessibility of formal health providers and services (Judd, Jackson, et al., 2006). Health service providers report people's lack of time, resources and energy during drought as barriers for help seeking (Alston & Kent, 2004).

Older people

Drought impacts on the emotional, mental and physical health of older people.

On average, people working in agriculture are becoming older, with poor and declining incomes, and living in more socially isolated circumstances (ABS, 2008; Edwards et al., 2019; Wang et al., 2017). Importance needs to be placed on meeting the needs of older rural people and addressing the impact of socioeconomic disadvantage among rural aged populations (Casey et al., 2021; Horton et al., 2010; National Rural Health Alliance & Community Services, 2004).

Ageing farmers have identified concerns during drought regarding declining physical ability, decreased confidence in decision-making and loss of identity as a farmer (Health, 2007; Smith et al., 2014). Other concerns include a loss of a sense of contribution to the community, amassed during their working life, and the satisfaction and respect this brought. Loss is also felt in relationships due to out-migration, with loss of community status, social capital and social isolation impacting on many older community members (Alston, 2007; Alston & Kent, 2004, 2008; Casey et al., 2021; Polain et al., 2011; Rich et al., 2018).

Others reported substantial financial loss and challenges faced in leaving farms and managing succession, and the perceived isolation from families and community networks (Health, 2007). Some have negative attitudes towards change or adopting new technology and fearing being 'left behind' (Carnie et al., 2011).

Due to financial constraints, older people may be required to increase their workloads. Older male farm family members may be working long hours on the farm (often in poor health) as they are unable to pay for hired labour (Alston, 2007). The physical strain and exhaustion from working full days affects their overall wellbeing (Alston & Kent, 2004). Older females may have to provide child care for working daughters and daughters-in-law (Alston, 2007).

Older people often express the government and community having greater mistrust in farmers due to the increasing number of regulations and government compliance requirements (Carnie et al., 2011; Harvey, 2007; Polain et al., 2011).

As older farmers resist using mental health services, joint services related to health and well-being simultaneously with trusted business management services has been recommended (Polain et al., 2011; Stehlik et al., 1999). Success in service use for older farmers may be enhanced through after-hours services, taking services to farmers, or offering telephone or online services (Polain et al., 2011).

Partnerships with Aboriginal Community Controlled Organisations are critical to addressing the needs of ageing Aboriginal people (Horton et al., 2010).

2.8 Suggested programs

In many of the studies investigated, strong links have been made between climate change and climate-related exposures, including heat, humidity, rainfall, drought, wildfires, and floods (Charlson et al., 2021). A scoping review of climate-related exposure and mental health by Charlson et al. (2021) assessed the literature in response to the World Health Organisation's (WHO) five global research priorities for protecting human health from climate change: assessing the risks; identifying the most effective interventions; guiding health-promoting mitigation and adaptation decisions in other sectors; improving decision-support; and estimating the costs of protecting health from climate change (Charlson et al., 2021; WHO, 2009). This scoping review found Australian case studies highlighting the role of rural health services interventions in health promotion education and advocacy (Purcell & McGirr, 2018), and community garden interventions that improved social connectedness and mental and physical health (Patrick & Capetola, 2011). International studies have examined the impact of climate change on health and recommend health promotion education through prevention and counselling (Valois et al., 2016).

Services such as rural financial counsellors and drought support workers are seen as accessible and significant supports, doing home visits and providing assistance with completing forms (Alston & Kent, 2004). Financial Counselling Services are seen as being a culturally appropriate source of support and advice, lacking stigma (Alston, 2007). While it has been suggested rural financial planners could provide mental health information and are an important gateway to health care, financial counsellors are not specifically trained to provide emotional counselling to deal with the emotional stress many people present with (Alston, 2007; Alston & Kent, 2004; Fuller et al., 2009; Polain et al., 2011).

Polain et al. (2011) recommend older farmers would benefit from joint services related to health and well-being simultaneously with trusted business management services due to their reluctance to use mental health services (Polain et al., 2011). Service access could be improved through after-hours services, taking services to farmers, or offering telephone or online services (Polain et al., 2011). While farming families tend to express their distress as a need for income support, there is a need for counselling and advice (Alston & Kent, 2004; Stayner & Barclay, 2002).

Young people have expressed the need for coordinated mental health support services within schools, and having access to mental health programs that have been adapted to rural settings (Carnie et al., 2011). Young people seek schools working together, more information about mental health, and where to seek help for them and their friends (Carnie et al., 2011). They report feeling overwhelmed, wanting help for their immediate worries from trustworthy support people who understand drought and rural circumstances (Carnie et al., 2011).

Health and social services multicomponent collaborative community programs are needed to address prevention and early intervention for emerging mental health needs in rural areas (Horton et al., 2010). Increasing local service networks and collaboration, strengthening community social networks, social capital, communication of pathways to care for distress, and early recognition and effective response to mental health problems are also likely to be effective in mitigating the impact of drought.

National Drought and North Queensland Flood Response and Recovery Agency has collated information on the government's response to drought, reporting the government's commitment of more than \$8 billion since 2018-19 to support drought affected communities (NDNQFRA, 2022). The Australian federal government currently supports farmers in drought through the following measures summarized in the table below:

Table 1 Federal government response measures to drought (NDNQFRA, 2022)

Measures	Description	Outcomes
Farm Household Allowance (FHA)	FHA payments to families experiencing financial hardship. Case management services, activity supplements for planning and training, and independent financial assessments may also support efforts to enhance farm management resilience and sustainability.	<ul style="list-style-type: none"> • Help farmers develop strategies for self-reliance. • Build capacity to make business decisions where the farm business is unsustainable.
Rural Financial Counselling Service (RFCS)	Employing officers to support farming families through financial counselling services.	<ul style="list-style-type: none"> • Encourages the dissemination of knowledge and deepening community understanding of existing drought adaptation practices. • Increasing human adaptive capacity.
Drought Communities Small Business Support Pilot	Expanding RFCS services to small farm related businesses.	<ul style="list-style-type: none"> • Encourages robust risk management
Drought Community Support Initiative (DCSI)	DCSI provides \$3000 payments through charitable entities to eligible drought-affected households.	<ul style="list-style-type: none"> • Support local communities through short-term assistance and referrals to wrap-around services support health and wellbeing of farming families and communities by providing support akin to emergency relief. • Improve levels of economic activity in regions.
Drought Community Outreach Program	Recipients will receive support at outreach events including from Australian and state government departments, charities, education providers, small business assistance, land management agencies and agricultural stakeholders. Communities can access a range of support and case management services that benefit whole communities.	<ul style="list-style-type: none"> • Human capacity building. • The dissemination of knowledge. • Encourages local regional spending and economic stimulus.
Country Women's Association (CWA)	\$3000 payments under the CWA	<ul style="list-style-type: none"> • Encourages local regional spending.
FarmHub	A central online tool for drought information.	<ul style="list-style-type: none"> • Information sharing, • Coordination and communication of drought measures.
Regional Investment Corporation loans (RIC)	RIC loans provide concessional loan products.	<ul style="list-style-type: none"> • Mitigate the risk of providing loans to unviable operators.

Measures	Description	Outcomes
Bureau of Meteorology radars	Drought indicator information.	<ul style="list-style-type: none"> Provision of and access to free, public and open quality data.
Regional weather and climate guides	The Bureau of Meteorology, FarmLink and CSIRO to develop guides that help farmers understand risks and opportunities for medium and long-term planning .	<ul style="list-style-type: none"> Access to quality data. Assist business decision making.
Improving Great Artesian Basin Drought Resilience	Supporting farmers to be more water efficient and prepared for future droughts.	<ul style="list-style-type: none"> Encourage innovations in water efficiency and locating new potential water resources.
Taxation Measures	Measures such as accelerated depreciation for fodder storage assets, and Farm Management Deposits (FMDs).	<ul style="list-style-type: none"> Tax relief
On-farm Emergency Water Infrastructure Rebate Scheme	Rebate scheme encourages drought resilience and preparedness.	<ul style="list-style-type: none"> Implement preparedness, response and recovery programs. Support farming businesses to prepare for drought and enhance long term sustainability and resilience. To support farmers' water efficiency. Increasing water supply. Reducing inequalities regarding water usage Increasing efficiency
Water for Fodder	Providing discounted water to grow fodder and support drought-affected communities.	<ul style="list-style-type: none"> Supporting response and resilience
Mental Health Initiatives	Empowering our Communities program, Trusted Advocates Trial Connecting Youth Awareness Initiative Telehealth Services	<ul style="list-style-type: none"> Mitigate the effects of drought on mental health

The government response includes initiatives such as the \$5 billion Future Drought Fund which provides secure, continuous funding for drought resilience initiatives to enhance drought preparedness. The Australian Government has allocated a further \$94.5 million in the 2022-23 Budget over 2022-23 to 2027-28 to continue delivery of the Drought Resilience Funding Plan 2020-2024 (DAWE, 2021). As reported in the 2020-21 annual report, the Future Drought Fund has:

- established eight Drought Resilience Adoption and Innovation Hubs across Australia to drive regionally focused efforts to develop, extend, adopt and commercialise drought resilient practices and technologies;
- worked with state and territory governments to establish tailored programs to deliver training to farmers on risk planning, and to develop local led community plans to manage drought risks;

- released the first prototypes of online tools to make climate risk and resilience information more accessible and useful for farmers, agricultural businesses and communities so they can better understand drought and other climate risks;
- partnered with the Australian Rural Leadership Foundation and the Foundation for Rural and Regional Renewal to establish programs to bolster the role community organisations, networks, leaders and mentors play in driving action to get better prepared for drought, and to support people in times of drought; and,
- have 80 on-ground projects underway to trial and support adoption of land management practices that can lessen the effects of drought on agricultural productivity (DAWE, 2021).

In Western Australia, \$28 million dollars has been allocated to local activities and projects.

- Climate Services for Agriculture - Drought Resilience Self-Assessment Tool (CSA DR. SAT). Co-design activities.
- Drought Resilient Soils and Landscapes. Five funded projects covering: Below and above ground targeted soil moisture conservation; Australian rangeland catchments trial; sowing opportunities for increased farm resilience; Drought resilient landscapes; and drought resilience of Western Australia's southern rangelands.
- Future Drought Fund Drought Resilience Innovation Grants. Six grants covering the following programs: A sustainable weather certificate industry project; Give a dam; Kondinin group drought resilience for agriculture research extension and adoption program; The benefits of shelter belts; WaterSmart Dams - making dams work again; and Wheatbelt drought resilience small to medium enterprise planning.
- Future Drought Fund Drought Resilience Leaders Program (DRLP) (Four projects).
- Natural Resource Management Drought Resilience (NRM DR) Program. Eleven grants covering the following programs: Aiding farmers to make better NRM decisions using remote sensing; Drought resilience dashboard for southern WA: tools & technologies to deliver adaptive and resilient land management practices; Exploring stubble management systems in broadacre cropping to ensure ground cover is maintained on the sandy soil types in the Northern Agricultural Region of WA to mitigate production risk caused by changing climate and significant climatic events; Implementation of perennial forage shrubs in mixed farming systems of the Central Great Southern of Western Australia, increasing on-farm drought resilience; Improving farm soil health and resilience through biodiversity in the Lower Blackwood; Increasing groundcover to build resilient soils in the Western Fitzgerald Biosphere; Putting our soils under the microscope; Using banded soil moisture retention technology to increase soil water use and herbicide efficacy for improved canola emergence and economic resilience in the WA Wheatbelt; Using long season crop varieties to increase soil water use and nutrient cycling on the deep sandy soils of the West Midlands region; Beyond Reasonable Drought; and Farmers helping farmers to maximise soil-moisture and production from Australia's most prolonged drought area.
- Networks to Build Drought Resilience (NBDR). Seventeen funded networks including: Hopetoun Community Electronic Noticeboard; Rehydrating the Southern Rangelands of WA; Talkin' Soil Health - for Drought Resilience; Women In Ag Networking and Diversification (WAND) Program: Strengthening social connection and farm business resilience in the regional agricultural; Balingup – A Call to Action; Farm business forum for new and early career Farmers in the Facey Group catchment and surrounds; Nyabing Community Hub Accessibility and Functionality Project; Leeman Community Networking Beach Shelter Project; Strengthening Community Capabilities and Networks for Future Drought Resilience; Lower Blackwood Online Community Forum & Information Hub; People of Pingelly - Past & Present; Climate Conversations Conference; Showcasing Our Resilience - Sharing Our Stories Across The Southern Rangelands; Livestock Leaders Drought Resilience Workshop; Strengthening drought resilience through collaborative Aboriginal networks and connected regenerative farming hubs; Saltwater Country-ACV Collaboration for Kimberley Indigenous Drought Resilience; and SPAA Community Field Days - Supporting Drought Resilience.

- Research and Adoption Program. Two programs including the Northern WA/NT Drought Resilience Adoption and Innovation Hub and the South-West WA Drought Resilience Adoption and Innovation Hub.

Other programs in Western Australia to support rural communities include:

- North East Ag Region (NEAR) strategy and projects. NEAR supported projects included: Decision Making and Tactical Tools for 2008 and Beyond in the North Eastern Agricultural Region (NEAR); Adapting to Climate Change in the North Eastern Agricultural Region (NEAR), Viability of Farming in the North Eastern Agricultural Region (NEAR); and The Implementation Plan in the North Eastern Agricultural Region (NEAR)
- WA Drought Pilot Work. The WA Drought Pilot Work helped improved the drought resilience of farmers who participated in the Farm Planning and Building Farm Businesses programs through building social capital and improving connectedness within rural communities.
- Regional Men's Health Initiative. The Regional Men's Health Initiative funded by Royalties to Regions, focuses on improving the health and wellbeing of men in regional Western Australia by empower men and communities to take responsibility for their wellbeing and health.
- Rural West. DPIRD supports free financial counselling services to assist primary producers and regional small businesses.
- The Drought Communities Programme. Funding is available for eligible councils (up to \$1 million) in areas impacted by drought.

Non-farming community

There is a need for the whole community to be supported during drought with many people and businesses in the non-farming community also impacted. Drought is synonymous with loss of income and out-migration; locals not earning and spending money and less people in the community results in less spending in the community generally impacting on the viability of local businesses (Alston & Kent, 2004; Aslin & Russell, 2008; Casey et al., 2021). Business downturns result in changes of staffing levels (redundancies) and staffing hours (fulltime to part-time or casual, eliminating casual hours) which financially impacts the whole community (Alston & Kent, 2004; Aslin & Russell, 2008).

During drought business owners express feelings of responsibility for demoralization in staff, having to let staff go, not being able to provide for family and employees, uncertainty to plan ahead with the business and a lack of control (Sartore et al., 2008). Emergency financial assistance programs may not be available to non-farm business people, even though their businesses are affected by the downturn in the farming sector (Sartore et al., 2008). Continuing drought leads to increased demand for agricultural products using credit which business owners cannot afford to support (Sartore et al., 2008).

Out-migration also leaves rural communities with workload and workforce issues affecting local businesses and the community into the future, with a skills shortage and a reduced population to run businesses, undertake volunteer work, be involved in service clubs and community activities, and have knowledge of infrastructure and how to operate vital machinery such as fire-fighting equipment (Aslin & Russell, 2008; Sartore et al., 2008).

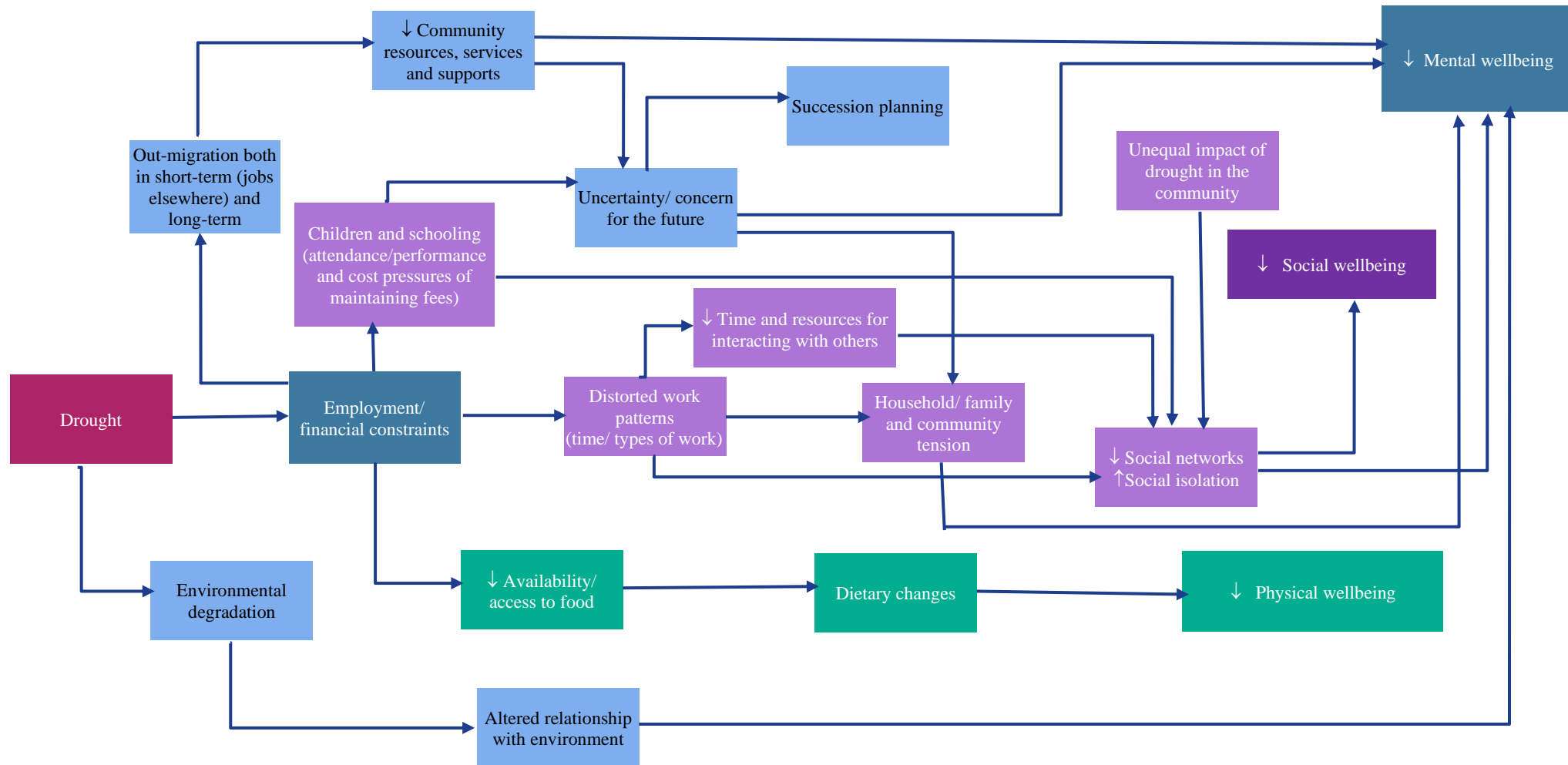
Increased work-loads and low incomes during drought leaves little capacity to participate in community social events, while out-migration from communities leads to a loss of social capital and a reduction in social activities and community groups, impacting on the cohesion of rural communities (Alston & Kent, 2004; Edwards et al., 2008; Stehlik et al., 1999). Lower community social cohesion can also result from differentiation in interests between farm and town communities (Edwards et al., 2008; Stehlik et al., 1999).

A reduction in population is associated with higher rates of closures of key services: banks, schools, hospitals, medical practices, health services which has implications on service access and delivery for the whole community (Edwards et al., 2008, 2019).

Summary

This chapter has summarised the relationship between direct and indirect impacts of economic factors on social outcomes such as out-migration, employment, health and wellbeing, family relationships, mistrust of government, uncertainty over the future, community resources and service and support systems. Figure 9 is a graphical representation of these relationships.

Figure 9 Relationships between the social impacts of drought



3. RESILIENT COMMUNITIES

Resilience is a highly complex dynamic phenomenon that fluctuates over time and needs to be understood in the context of wider social and economic systems (Greenhill et al., 2009). Resilience is a construct with two parts: exposure to adversity, and positive adaptation (Greenhill et al., 2009; Luthar et al., 2000). Individual and community level resilience are described as 'synergistic' and increasing both is essential to managing drought in rural communities (Chenoweth & Stehlik, 2001). The resilience between communities and individuals results in stronger communities that support the individuals within them (Chenoweth & Stehlik, 2001).

There are many models presented in the literature on factors which promote resilience in both communities and individuals. Resilience is sometimes viewed as a process of capacity building or enhancement, sometimes as an outcome, and sometimes as both a process and an outcome (Cutter, 2016). The models in the following sections provide different but related perspectives on individual and community resilience in drought affected communities.

3.1 Individual Resiliency Factors

Individual resilience refers to the capacity to recover quickly from difficulties and negative experiences such as trauma, tragedy, threats, or significant sources of stress. There are many definitions of individual resilience, which include the concepts of capacity, adaptation, challenge and recovery:

- The process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances (Masten et al., 1990)
- The capacity for successful adaptation, positive functioning, or competence despite high-risk status, chronic stress, or following prolonged or severe trauma (Egeland et al., 1993)
- Good adaptation under extenuating circumstances; a recovery trajectory that returns to baseline functioning following a challenge (Butler et al., 2007)

Factors that frequently emerge as contributing to coping and promoting resilience include individual characteristics (personal attitude, temperament, internal motivation, self-concept), spirituality/religion/faith, education, financial security, and attachments to and social support from family, friends and the broader community (Austin et al., 2018; Greene et al., 2004; Stain et al., 2011; Zimmerman et al., 2013; Zolkoski & Bullock, 2012).

Several studies have explored the factors influencing resilience within Australian farming communities and coping strategies used to mitigate the impact of drought. However, exposure to drought for an extended period, or exposed to a more intense or severe drought, decreases resilience and increases vulnerability to mental health issues (Vins et al., 2015).

Interviews with families from New South Wales who had experienced extended drought provides insights into coping strategies used to mitigate the impact of drought (Caldwell & Boyd, 2009). Three broad domains of coping strategies were problem-focused coping; psychological coping strategies (individual); and collective coping strategies (Caldwell & Boyd, 2009). Problem focused coping involved succession planning, expansion and diversification. Psychological coping strategies that had a positive effect on their ability to cope included perspective, optimism, perceived vigour, comparing their situation with those worse off, and cognitive dissonance and denial - not acknowledging their current situation (Caldwell & Boyd, 2009). Collective coping strategies drew on a strong sense of family and community and involved support from partners and children, community events, support networks, connection to the area, social debriefing, indirect support from the community, and avoidance of negative social influences (Caldwell & Boyd, 2009). However, the authors noted that strategies changed as drought continued and the impact of the drought increased. Optimistic strategies and reliance on social capital were replaced with denial and dissonance, social avoidance and competition (Caldwell & Boyd, 2009).

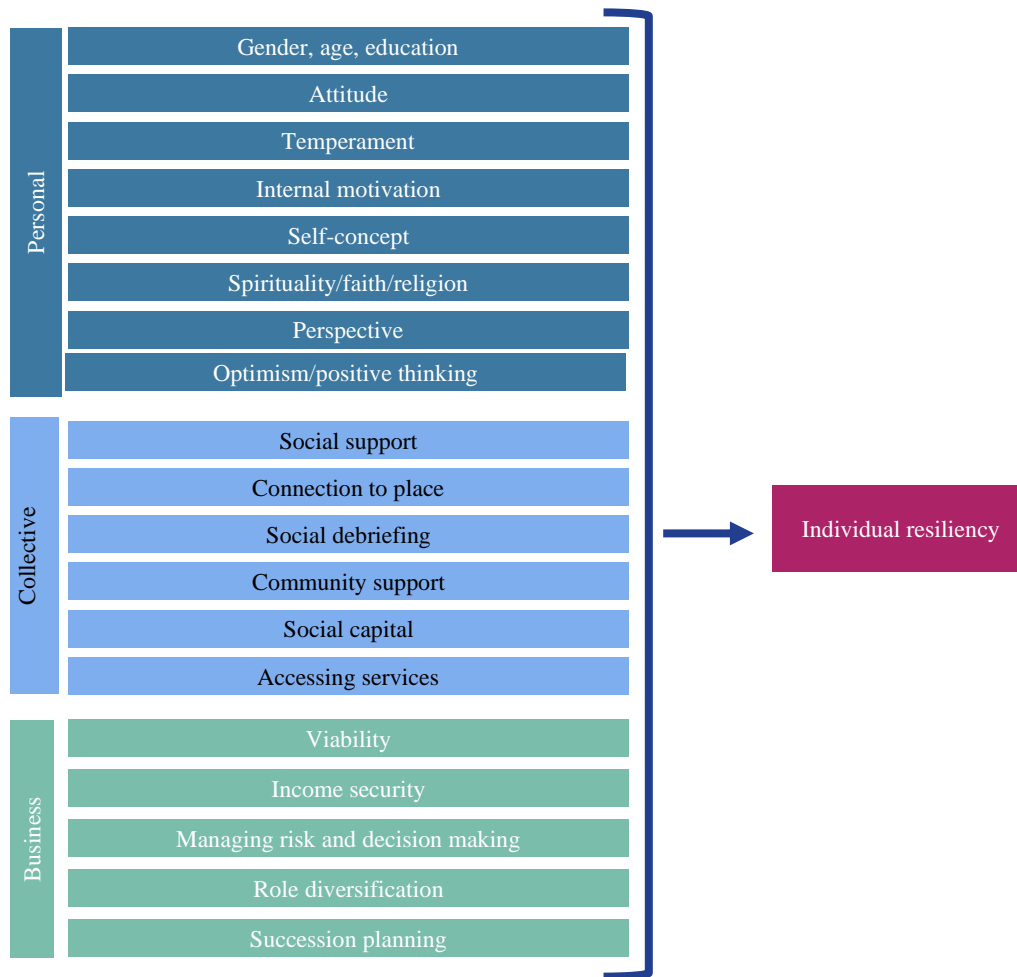
To gain greater understanding of resilience among families in drought-affected rural areas of South Australia, Greenhill et al., interviewed 80 families (Greenhill et al., 2009). The authors identified the following resilience factors which helped farmers to cope with drought:

- **Pre-existing viability of the business.** Pre-drought debt levels and capacity to make repayments, the use of Farm Management Deposits (FMD) as a means of equalising income over a period of time, stores of grain and feed on hand, and whether the business was in an expansion, consolidation or wind-down phase influenced the viability of the business and determined the ease at which the business could be managed through periods of low income.
- **Income security.** A regular income from using credit card payments, FMD's, off-farm investments, and savings help cover the costs of living and of maintaining minimum functions on farm and in the household during drought.
- **Managing risk and decision-making.** Research on issues affecting their business, finding and using 'experts' (agronomist, farm consultant, accountant, bank manager) who could be trusted to give good advice, and listening to what other farmers were doing assisted farmers to have confidence and capacity to make decisions. Proactive farmers managed risk through changing farming methods, developing alternative markets for their products, or investigating on and off farm income sources.
- **Diversification of role.** Farmers who were optimistic about their future were those who had the skills or qualifications to find off-farm work or diversify their income and felt they had options in moving forward.
- **Opportunities to disengage.** Physically and mentally disengaging from the farm by attending social events, social connection with family, friends and community was important and valued.
- **Health and well-being.** Health and wellbeing are affected by higher workloads and financial stress. Adaptive strategies for dealing with stressors including maintaining a positive outlook, addressing practical problems, drawing upon support from family and friends, maintaining social connections, and seeking help from mental health services.
- **Gender.** Drought is a gendered experience, with role changes during drought impacting on men and women differently (Alston & Kent, 2004; Stehlik et al., 2000). The impacts of changing roles and expectations have been highlighted in a previous chapter.
- **Age and generational change.** Rural communities are aging and drought impacts older farmers more severely than younger farmers (Sobels, 2007). Generational changes have occurred in farming, with farming becoming more professionalised, and profit margins reduced. There are also generational differences between ideas concerning retirement, the handover of the responsibilities, and succession planning which require adjustment by farm families.

In a mixed method study on suicide in Australian farmers, 32 farmers were interviewed to identify coping strategies to the stresses of owning and running a rural property (Judd, Jackson, et al., 2006). A useful and important strategy identified was discussing issues with family, friends and neighbours: however, farmers felt they needed to be positive and solution-focused when talking about problems (Judd, Jackson, et al., 2006). An attitude of determination was also identified as a coping strategy (Judd, Jackson, et al., 2006).

A systematic review on the mental health outcomes of drought, also reported on protective factors and coping mechanisms (Vins et al., 2015). Protective factors against poor mental health included: social support, social capital and sense of community belonging; knowledge regarding availability and access to services; mental health literacy; and government assistance and initiatives (Vins et al., 2015). Positive coping mechanisms for mental health effects of drought included employing practical solutions and active methods (including planning for the future), psychological methods (including positive thinking, acceptance and reframing of the problem), social support, distraction, taking a break, and religion or faith (Vins et al., 2015).

Figure 10 Factors which impact on individual resiliency



3.2 Community Resiliency factors

Community resilience has been defined by Brown and Kulig (1996, p 43) as “the capacity of community members to engage in projects of coordinated action within the context of their community despite events and structures that constrain such projects”, and by Magis (2010, p 401) as the “existence, development and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability and surprise”. Community resiliency, or the ability of a community to deal with adversity, has the potential to be both strengthened and weakened by adversity (Kulig, 2000; Kulig et al., 2005).

Definitions of community resilience involve recovery after trauma through the use of mediating social, physical, economic and environmental resources:

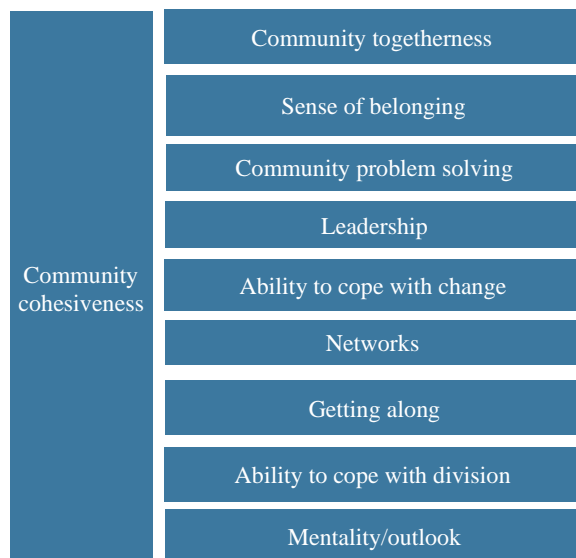
- The ability to recover from or adjust easily to misfortune or sustained life stress (Brown & Kulig, 1996);
- The process through which mediating structures (schools, peer groups, family) and activity settings moderate the impact of oppressive systems (Sonn & Fisher, 1998);
- The capability to bounce back and to use physical and economic resources effectively to aid recovery following exposure to hazards (Paton & Johnston, 2001);
- The development of material, physical, socio-political, socio-cultural, and psychological resources that promote safety of residents and buffer adversity (Ahmed et al., 2004);

- Individuals' sense of the ability of their own community to deal successfully with ongoing political violence (Kimhi & Shamai, 2004);
- A community's capacities, skills, and knowledge that allow it to participate fully in recovery from disasters (Coles & Buckle, 2004); and
- The ability of community members to take meaningful, deliberate, collective action to remedy the impact of a problem, including the ability to interpret the environment, intervene, and move on (Pfefferbaum et al., 2008).

Communities are considered resilient when they have qualities and assets that enable them to develop effectively or respond to adversity in ways that strengthen communal bonds, resources and the community's capacity to cope (Buikstra et al., 2010; Chenoweth & Stehlik, 2001). Community resiliency is perceived as a proactive process that could only occur with the right combination of visionary leaders and other community members who were willing to implement the vision - having a positive attitude was seen as important in this process (Kulig et al., 2005).

There are many models of community resilience. The model by Kulig et al. (2000) describes resilience in terms of community cohesiveness with mutual influences between the community's interactions and a sense of community (Figure 11 below). This study in three Canadian rural communities identified leadership, community problem solving, sense of belonging, community togetherness, mentality/outlook, ability to cope with divisions, getting along, networks, and ability to cope with change (Kulig, 2000). This is supported by Pfefferbaum et al. (2017), who recommends a framework for enhancing community resilience that recognises the importance of the social capital that emerges from improved social connections and social networks.

Figure 11 A community cohesiveness model (Kulig, 2000)



A participatory action research study within a rural Australian community identified key elements of both community resilience and an ideal resilient community (Buikstra et al., 2010). Elements included:

- **Infrastructure and Support Services.** Infrastructure and support services was seen as most essential to community resilience and in the development of an ideal resilient community. A lack of water supplies, support services, recreational facilities, work opportunities, public transport impairs community resilience.
- **Social Networks and Support.** A supportive social network (family, friends, community) based upon shared cultural, economic, or recreational interests, was considered the most important element of both community resilience and an ideal resilient community.
- **Positive Outlook.** Determination, perseverance, and the ability to bounce back from adversity were reported as essential components of community resilience.

- **Learning.** Community resilience was considered to be the result of a community's ability to learn from experiences of adversity.
- **Early Experience.** Cultural and heritage factors shape the future for the community.
- **Environment and Lifestyle.** The surrounding environment, aesthetic appeal of a community and associated lifestyle factor into community resilience.
- **Sense of Purpose.** Overcoming adverse events, and participating in community events creates a shared sense of purpose, which is particularly important in times of crisis.
- **Diverse and Innovative Economy.** Social, economic, and cultural diversification promotes new ideas and innovation, and provides employment.
- **Embracing Differences.** Individual differences (cultural background, social standing, age, length of residency, disadvantage, and occupational factors) and diversity bring positive influence to a community.
- **Beliefs.** Shared religious beliefs or practices are an important component of community resilience. Conversely, not belonging to in-groups can lead to a lack of acceptance and to exclusion, impairing community coherence and unity.
- **Leadership.** The need for good leadership is imperative in creating an ideal resilient community.

The following model of resilience is based on a community's potential to function effectively and adapt successfully after a disaster. Community resilience is a process linking a network of adaptive capacities with adaptation seen in population wellbeing, functioning, and quality of life (Norris et al., 2008). Together, economic development, social capital, information and communication, and community competence are sets of adaptive capacities which build collective community resilience (Norris et al., 2008). Communities must reduce risk and resource inequities, engage local social networks, create community linkages and effective collaboration, and communication through trusted sources of information.

1. **Economic development.** Economic development includes volume and diversity of economic resources, within and across communities. Resource equity and social vulnerability involves allocating environmental risk equally, and the capacity to distribute resources to those of greatest need.
2. **Social capital.** Social capital is the aggregate of the actual or potential resources linked to a relationship network. Ideally these networks are reciprocal, involve frequent supportive interactions, overlap with other networks, have the ability to form new associations, and support a cooperative decision-making process. Social support (helping behaviours within family and friendship networks) involves perceived social support, which is the belief that help will be available if needed, and received social support, which should positively correlate with severity of exposure. Sense of community, place attachment, and citizen participation enables community bonds, roots, and commitments which are essential elements of community resilience.
3. **Community competence.** Community competence involves collective action, decision-making and effective collaboration. Collective efficacy, a reflection of trust in the effectiveness of community action, is highly related to empowerment and is fundamental in facilitating community action.
4. **Information and communication.** Information enables adaptive performance, whereas communication refers to common meanings and understandings. Systems and infrastructure need to be in place for informing the public of risks and recommendations. Information needs to be communicated through sources who are reliable and trusted by the community. Communal narratives are the communities shared understandings of reality and contribute to a sense of place and connectedness, affecting resilience.

Figure 12 Community resilience as a set of adaptive capacities (Norris et al., 2008)



Many studies describe rural community resilience and models which rely on community values, collective coping mechanisms and inclusive problem solving processes, social cohesion, economic and social infrastructure, and leadership when faced with adversity (Boyd et al., 2008; Kulig et al., 2005). Community development models which incorporate health promotion, education, and early intervention have been effective in building resilience in chronic drought-related hardship [85].

3.3 Measuring resilience

Disaster resilience is a difficult concept to measure but it is important to do so to assist in a community's assessment and prioritization of needs and goals, establishing baselines for monitoring progress and recognizing success, and to raise community awareness of understanding the costs and benefits of enhancing resilience within a community (Cutter, 2016). Researchers view resilience as both a process and an outcome, which influences how and what is measured (Cutter, 2016).

As resilience cannot be measured directly, assessment of disaster resilience is commonly through indices (containing indicators which represent a selected characteristic of resilience), scorecards (an evaluation of performance or progress toward a goal), and tools (e.g., models and toolkits developed to measure resilience) which use a suite of variables as proxies for resilience (Copeland et al., 2020; Cutter, 2016). However, it is difficult to measure transformative capacities through indices. Currently resilience is measured as a characteristic of a community as it now exists, not as the potential for transformations that will/could happen within and to that community after a crisis such as drought (Copeland et al., 2020).

A list of existing community disaster resilience assessment measures used in the United States is displayed in the table below. There are common elements in the assessment measures for measuring community resilience, including attributes and assets (economic, social, environmental, infrastructure) and capacities (social capital, community functions, connectivity, and planning) (Cutter, 2016).

Table 2 Existing disaster resilience assessment measures used in the United States (Cutter, 2016)

Measure name (authors)	Type
Communities Advancing Resilience Toolkit (CART) (Pfefferbaum et al. 2011 , 2013)	Tool
Conjoint Community Resiliency Assessment Measure (CCRAM) (Cohen et al. 2013)	Tool
Coastal Resilience Index (Sempier et al. 2010)	Score-card
Community Based Resilience Analysis (CoBRA) (UNDP 2014)	Tool
Community Resilient System (CARRI 2013 ; White et al. 2015)	Tool
Community Resilience Index (Sherrieb et al. 2010)	Index
Food and Agriculture Organization (FAO) Livelihoods (Alinovi et al. 2010)	Index
Oxfam Great Britain (GB) (Hughes and Bushell 2013)	Index
Population and Demographics, Environmental/Ecosystem, Organized Governmental Services, Physical Infrastructure, Lifestyle and Community Competence, Economic Development, and Social-Cultural Capital (PEOPLES) (Renschler et al. 2010)	Tool
Rockefeller 100 resilient cities (ARUP and Rockefeller 2014)	Tool
Rural Resilience Index (RRI) (Cox and Hamlen 2015)	Index
San Francisco Bay Area Planning and Urban Research Association (SPUR) (San Francisco Planning 2009)	Score-card

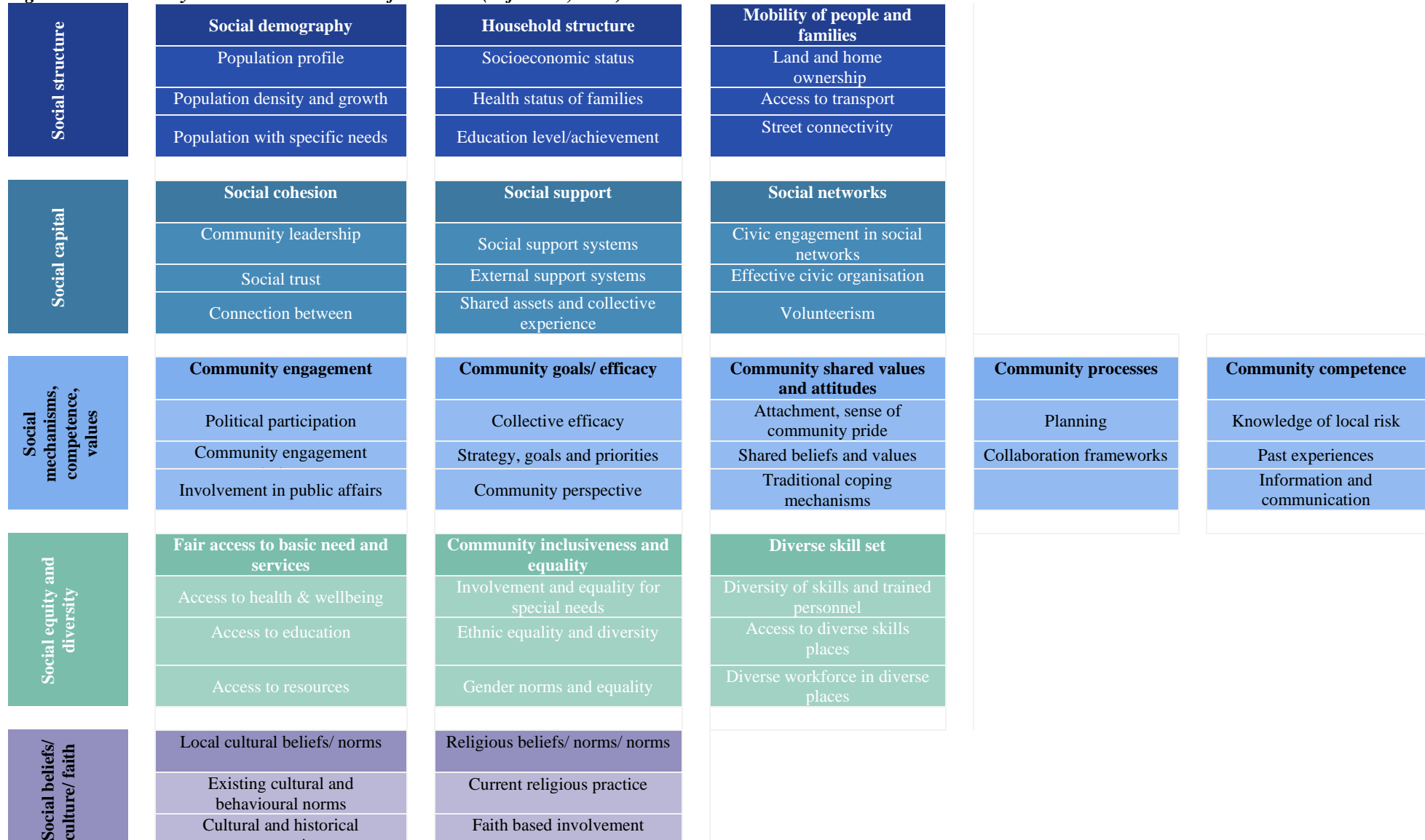
Assessment consists of measuring a core set of attributes/assets, capacities, and proxy measures. In a review of the current assessment measures of disaster resilience, Cutter (2016) found twenty-four broad resilience measures characterised by:

- economic capacities or indicators e.g., education, education equality, annual income, wealthy retirees, household income;
- social capacities or social indicators e.g., number of civic organisations, registered non-profit organisations, health access, faith-based networks;
- community indicators including capacities, physical assets or infrastructure e.g., community services;
- environmental indicators e.g., impervious services that prevent or hinders the absorption of water into the soil; and
- institutional or governance indicators e.g., insurance policies. (Cutter, 2016).

Saja et al. propose an inclusive and adaptive social resilience disaster framework consisting of five sub-dimensions of social resilience (social structure, social capital, social mechanisms, social equity, and social belief), a set of 16 characteristics and 46 corresponding indicators (Saja et al., 2018). Saja and colleagues established the framework from the most common and important resilience characteristics that can be adapted to any geographical, hazard, or community context from 31 different social resilience frameworks (Saja et al., 2018).

This framework, illustrated below, allows for measuring social resilience, with many of the indicators and proxy measures available in the public domain.

Figure 13 Community resilience measurement framework (Saja et al., 2018)



i

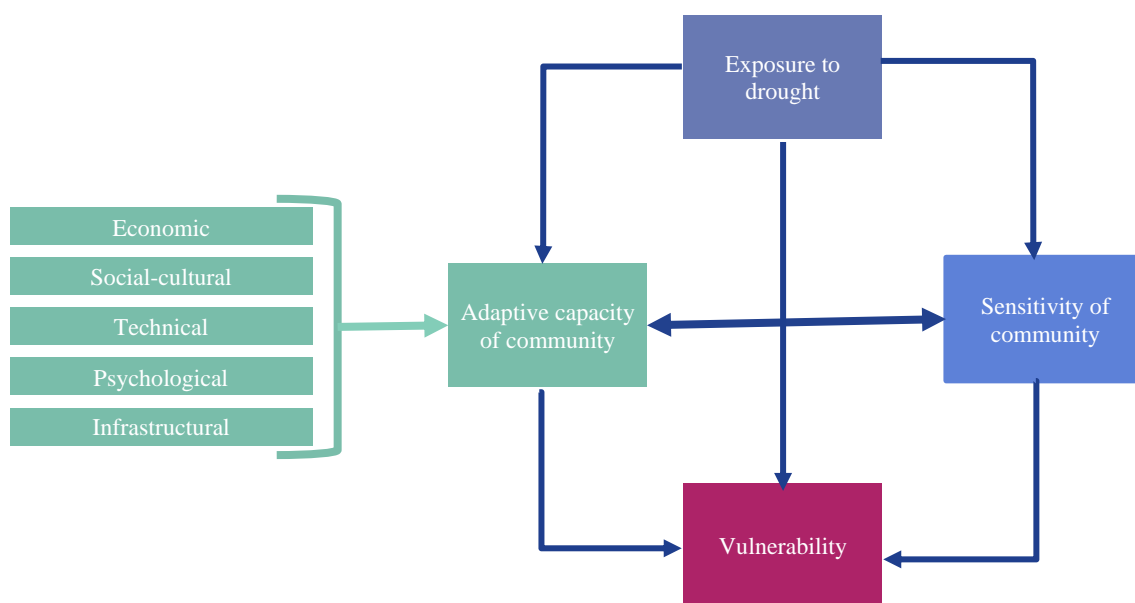
4. DROUGHT VULNERABILITY

Drought vulnerability is the degree of susceptibility within society and the capacity to cope with the adverse impacts of drought (Ahmadalipour & Moradkhani, 2018; Sena et al., 2014). Vulnerability occurs when resources are not sufficiently robust to create resilience (Norris et al., 2008).

Vulnerability is a function of three major drivers: exposure to drought, the sensitivity of the community and the adaptive capacity of the community (Figure 14) (Zarafshani et al., 2016). This aligns with the regional drought vulnerability assessment method undertaken by the Future Drought Fund Regional Drought Resilience Planning Program in Western Australia.

Exposure is the extent (frequency, intensity, magnitude, duration) of impact of the drought, sensitivity is the degree to which the community is affected by the drought, and adaptive capacity is the ability of the community to respond to the exposures and the effects of drought in order to adjust to and cope with the impacts (Zarafshani et al., 2016). The relationship between the adaptive capacity (or resiliency) of a community and the vulnerability of a community to drought is influenced by economic, socio-cultural, technical, psychological, and infrastructural factors (Zarafshani et al., 2016). Adaptive capacity allows communities to counteract sensitivities and reduce vulnerability to drought (Zarafshani et al., 2016).

Figure 14 Factors impacting on community vulnerability to drought (Zarafshani et al., 2016)



The most vulnerable groups during drought are identified as a result of combining these three factors.

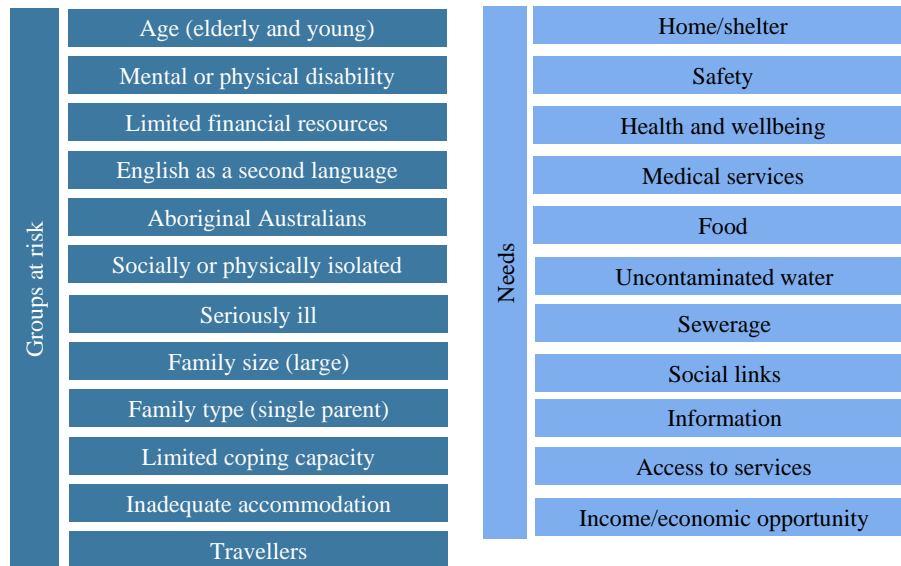
4.1 Vulnerable groups

The assessment of who and what is vulnerable and why in drought affected regions recognizes the interactions between drought risk and vulnerability and is an important part of drought mitigation and planning (Buckle et al., 2000; Sena et al., 2014). Vulnerable groups are unable to provide for their basic needs because of adverse economic and health conditions, and may differ due to region due to diverse economic, political, social, and historical influences (Zarafshani et al., 2016).

Diverse social determinants influence the varying degree to which vulnerable people within the community are able to adapt to drought.

Figure 15 below shows the different groups of people at risk with the community, their immediate needs during drought conditions, and how vulnerability and needs can be related to individual and socio-economic factors as well as access to infrastructure and information sources (Buckle et al., 2000; Vins et al., 2015).

Figure 15 Vulnerable people in the community (Buckle et al., 2000; Vins et al., 2015)



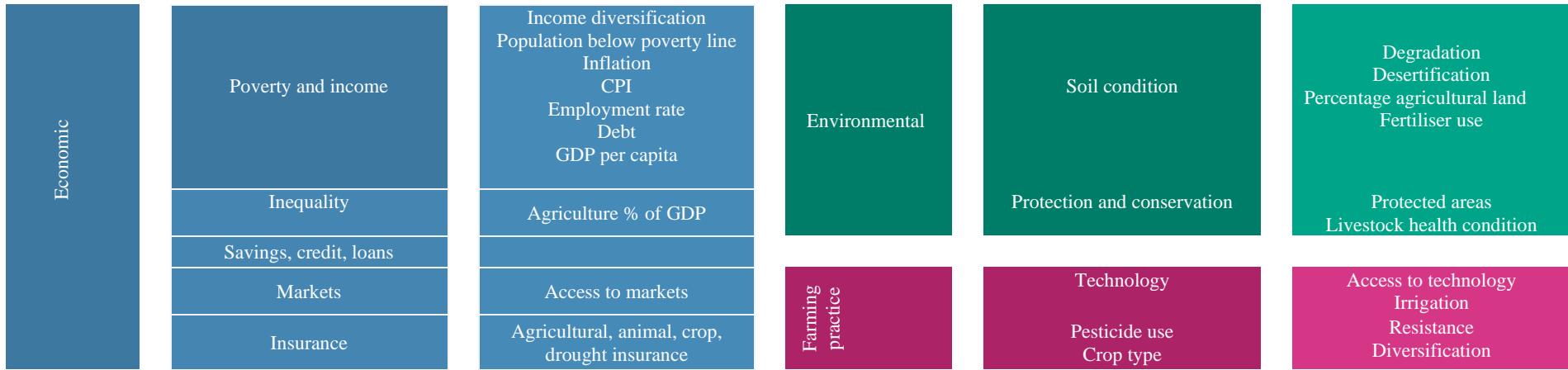
4.2 Assessing vulnerability

Vulnerability assessments aim to identify vulnerable groups within a community and to determine ways to make the affected population less vulnerable, or more resilient, through identifying underlying causes of risk derived from inadequate structures, management, and technology, or driven by economic, environmental, and social factors (Iglesias et al., 2009; Zarafshani et al., 2016). Assessment methodologies use quantitative (an index based approach or dynamic simulation) as well as qualitative components (narratives or story lines) (Hagenlocher et al., 2019; Zarafshani et al., 2016).

A review of the literature shows dimensions related to social, economic, physical, crime and conflict, governance, environment and farming practice are deemed important factors to be measured as part of a vulnerability assessment (Ahmadalipour & Moradkhani, 2018; Carrão et al., 2016; Hagenlocher et al., 2019). The following figure illustrates the dimension, factors, and indicators used to measure drought vulnerability. Many indicators are publicly held data.

Figure 16 Dimensions, factors and indicators of drought vulnerability (Ahmadalipour & Moradkhani, 2018; Carrão et al., 2016; Hagenlocher et al., 2019) (Iglesias et al., 2009)

Dimension	Factor	Indicator	Dimension	Factor	Indicator
Social	Education	Adult literacy rate Indigenous and local knowledge	Physical	Availability and quality of infrastructure	Transportation Water and sanitation Energy consumption Water tanks Reservoirs Wells Water quality Road density
	Gender	Gender inequality			
	Age	% population aged 15-64			
	Social capital	Social networks			
	Health status	Alcohol and substance use Restricted mobility Life expectancy Mortality rate Life expectancy Disability Malnutrition Mental health	Crime and conflict	Stability	Crime War Conflict
	Health services	Health insurance			
	Remoteness	Rural/remote population	Governance	Plans and strategies Corruption and law enforcement Participation Assistance	Drought planning Investment in disaster prevention and preparedness Water management planning Lack of trust in institutions Government effectiveness Public participation in governance Political representation Availability of food and development projects
	Water demand	% of rural population with access to water sources			
	Awareness and information	Drought awareness Early warning Access to information Underestimation of drought risk			



4.3 Risk management response

Crisis management is the basis of many drought mitigation plans, however, studies indicate that effective drought management strategies are based on risk management (Hagenlocher et al., 2019). Effective drought risk assessments taking into account both drivers and patterns of risk and vulnerability and consider the effectiveness of actions of individuals and institutional bodies (Hagenlocher et al., 2019).

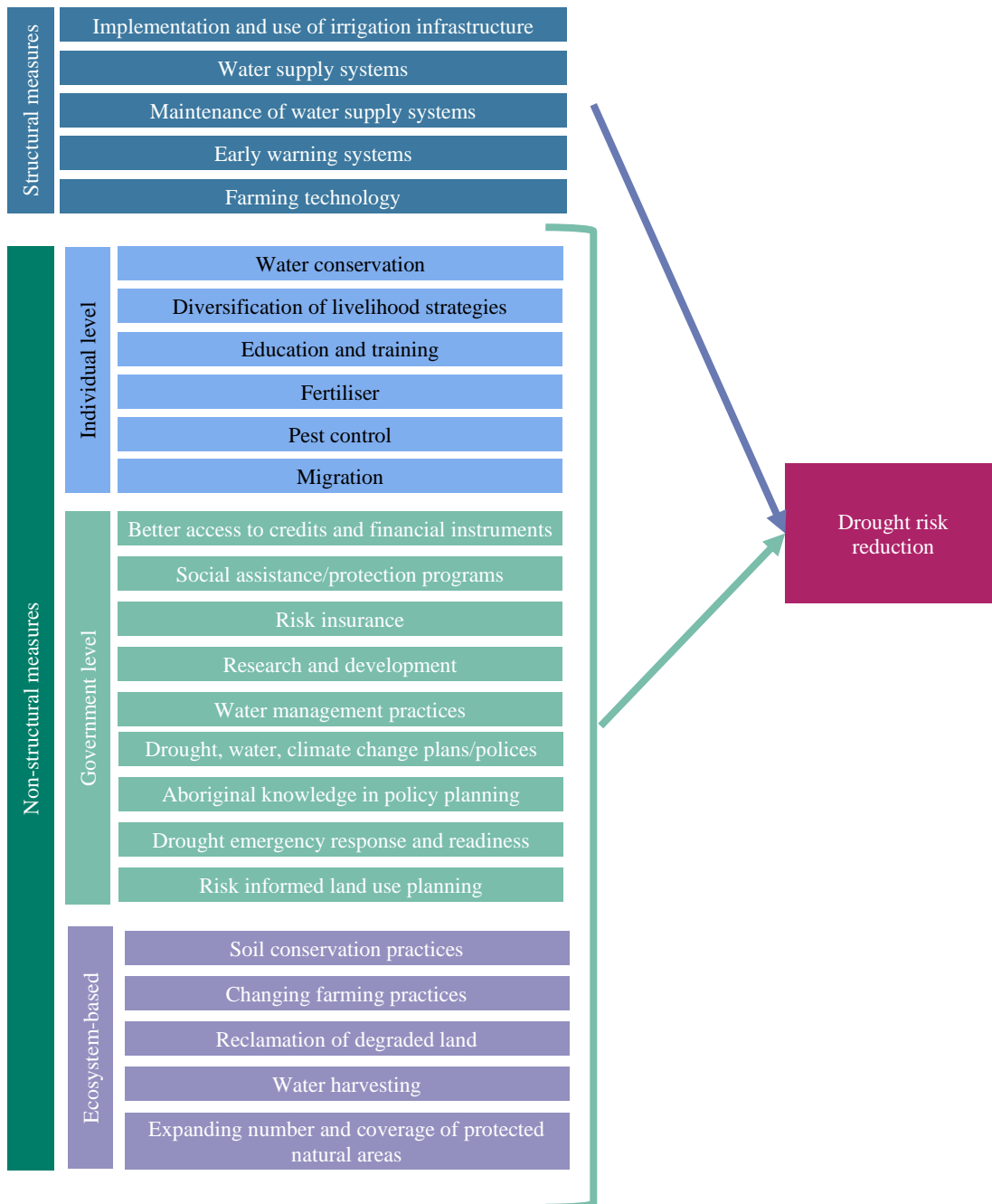
Drought risk management involves risk reduction (prevention, mitigation, preparation), disaster management (alert, response), and recovery and adaptation (rehabilitation) (Sena et al., 2014):

1. **Prevention.** Prevention involves the ongoing involvement of the community and local government in the dissemination of information, promotion of water conservation and sustainable water practices, monitoring of health in vulnerable groups and capacity building of local health services.
2. **Mitigation.** Working with local stakeholders in the local community to reduce and measure vulnerability and risk within the community, promotion of participation in public policy programs for water resource infrastructure, and participation in efforts to address drought impacts.
3. **Preparation.** Assessing response capacity, identifying local resources, establishing partnerships for action, participation in vulnerability and risk assessments, establishment of an action plan, and working with community leaders and local government to inform and create awareness within the community.
4. **Alert.** Community issued alert, active identification of vulnerable groups.
5. **Response.** Identify direct and indirect impacts of drought and the provision of an integrated response.
6. **Rehabilitation.** Evaluation of community vulnerabilities, risks, impacts, resilience to develop interventions.

A main impediment to adaptation is government support – and government response or support needs to empower the community, improve the adaptive capacity of the community, and thereby enhance community resilience (Zarafshani et al., 2016).

A list of drought risk reduction or adaptation strategies has been compiled by Hagenlocher et al. after a review of more than 40 studies, and is presented in Figure 17 (Hagenlocher et al., 2019). The risk reduction or adaptation strategies comprise a wide array of structural (i.e. engineering-based or technological) solutions and non-structural solutions at the individual, government and eco-system level.

Figure 17 Drought risk reduction and adaptation options (Hagenlocher et al., 2019)



5. TRANSITION ROADMAP

A heuristic transition roadmap has been developed for building resilience to the social impact of drought. The roadmap has been developed on the resilience literature and is presented as a starting point model. It includes four stages: infrastructure; governance; population retention; and social capital.

Stage 1: The availability and quality of infrastructure such as water and sanitation, energy, water tanks, reservoirs, road density, and support services are essential to community resilience (Iglesias et al., 2009). The infrastructure and preparedness of exposed communities can mitigate the impact of drought on health (Goss, 2008).

Health and wellbeing can be supported through maintaining and increasing local services to the community, encouraging outreach and visiting specialist and health services, and taking advantage of technology and online resources, platforms and telephone support services. There are currently many online and telephone support services and online resources to support the health and wellbeing of rural communities, for those considering working and living in rural communities, and for stakeholders to access key evidence about rural health:

<https://www.headtohealth.gov.au/supporting-yourself/support-for/rural-and-remote-people>

<https://www.healthdirect.gov.au/rural-and-remote-health>

<https://aifs.gov.au/cfca/topics/web-resources-rural-and-remote-families>

<https://www.ruralhealth.org.au/>

<https://dvassist.org.au/>

<https://www.lifeline.org.au/real-experiences/community-perspectives/rural-communities/>

<https://goingruralhealth.com.au/student-information/online-resources-for-students/>

Stage 2: Governance includes drought planning, government investment in disaster, prevention and preparedness, water management planning, and local community participation in governance (Iglesias et al., 2009). Secure and continuous government funding for drought resilience initiatives such as promoting drought resilient practices and technologies, deliver training to farmers on risk planning, and to develop local led community plans to manage drought risks are an important governance drought prevention and preparedness response. The ongoing involvement of community leaders and local government in the dissemination of information to inform and create awareness within the community is importance for drought prevention. There are also a number of online rural resources (such as <https://www.ruralresources.com.au/>) which offer a free resource database on farm management.

Stage 3: Population retention through financial support and employment opportunities. Loans and government payments need to be easy to access, forms easy to complete and available to both farming and non-farming populations. This will decrease out-migration and help to retain employment within rural communities.

Stage 4: Social capital can be built through encouraging social support, social networks, and social cohesion. Social support and social networks can be provided through family and friends, local emergency services and community and religious organizations, and formal services. Governments, health authorities, and community leaders need to promote the formation and maintenance of community groups due to the positive impacts on community well-being (Lyons et al., 2016). Both social and task focused community groups with participants having relatively equal-status relationships, enables each group member to feel included and respected and has a positive impact on wellbeing (Lyons et al., 2016). Social cohesion involves developing and implementing programs which strengthen intercultural community and address issues of social justice and inequality (Moran & Mallman, 2019). Stakeholders in rural communities have strengthened social cohesion through collaborative community initiatives, local historical narratives of rich cultural diversity and opportunities to celebrate the various cultures represented within the community (Moran & Mallman, 2019).

Figure 18 Drought transition roadmap

Stage 1	Stage 2	Stage 3	Stage 4
			Social capital
		Population retention	Social support Social networks Social cohesion
	Governance	Financial support	
Infrastructure	Drought planning	Employment opportunities	
Physical structures	Disaster prevention		
Local services	Water management		
Online and telephone support services	Local community participation		
Outreach services	Communication		

6. RECOMMENDATIONS

The *Understanding the social impact of drought* report provides a comprehensive review of the evidence around the social impacts of drought and factors which may mitigate the adverse social impacts. This report also presents an overview of the factors which make a community more resilient to drought, and factors which make a community more vulnerable to drought. Direct and indirect impacts of economic factors affect social outcomes such as employment, education, out-migration, family relationships, mistrust of government, uncertainty over the future and community resources, service and support systems. All these factors either directly or indirectly impact on health and wellbeing: physical, mental, social and emotional wellbeing. Models and social frameworks have been sourced which can be used to measure resiliency and drought vulnerability within a community.

The following summary recommendations have been made to mitigate the social impact of drought in rural communities.

Availability and quality of Infrastructure

The availability and quality of infrastructure is essential to community resilience and mitigating the impact of drought. Ensuring communities have sufficient infrastructure to support the needs of the whole community, including local health and financial services, will support the health and wellbeing of the community during drought. It is recommended vulnerability assessments include indicators of transportation, water and sanitation, energy consumption, water tanks, reservoirs, wells, water quality and road density.

Good governance

Governance involves drought plans and strategies, water management planning, and investment in disaster prevention and preparedness. Governmental support of drought risk management involving risk reduction, disaster management and recovery and adaptation will empower the community, improve the adaptive capacity of the community, and thereby enhance community resiliency to drought.

Population retention

Employment and financial constraints during drought lead to out-migration, impacting on social networks and the availability of local community services and employment opportunities. Population can be retained through government financial support, with loans and government payments providing income security for both farming and non-farming populations, decreasing out-migration and helping to retain employment within rural communities.

Increase local support service networks

Infrastructure and support services was seen as most essential to community resilience and in the development of an ideal resilient community. A lack of water supplies, support services, recreational facilities, work opportunities, public transport impairs community resilience. Drought is associated with the lack of availability and higher rates of closures of key services: banks, schools, hospitals, and medical practices. Within Australia, rural financial counsellors have been shown to be trusted invaluable supports during drought, with their services perceived to be culturally appropriate.

Strengthening community social networks and social capital

Community events, support networks, and having strong connections to the community are collective coping strategies used to support individual resilience. During drought, social support from family and friends, maintaining social connections and social capital, and the availability of health services to support health and wellbeing, enable community bonds, roots, and commitments to be formed, and are important elements of community resilience. Collaborative community programs can be used to strengthen community social networks, social capital, and communication of pathways to improve social connectedness and mental and physical health. Examples of successful community programs include community garden interventions which have been shown to improve social connectedness and mental and physical health.

Early recognition and effective response to poor mental health

Early recognition and effective response to poor mental health is likely to be effective in mitigating the impact of drought. Both Australian and international studies have recommended the engagement of rural health services in health promotion education and advocacy for the prevention and early

intervention of poor mental health. It is recommended after-hours access, home visits, telephone and online services for counselling and advice to be made available to the local community. Rural financial counsellors and drought support workers are seen as accessible and significant supports, and are an important gateway to health care. Mental health support services and counselling within schools, and having access to mental health programs that have been adapted to rural settings are recommended services and programs to support young people during drought.

Mapping government funded program outcomes against resiliency and vulnerability frameworks

In Western Australia, \$28 million dollars has been allocated to local activities and projects to support rural communities. It is recommended all funded activities, projects and programs have outcomes frameworks which are in line with the outcomes presented in the resiliency and vulnerability frameworks. This report gives domain measures of social structure, social capital, social mechanisms, social equity and diversity and social beliefs which can be used in a community resilient measurement framework. Indicators have also been given for the factors within the social and economic dimensions of drought vulnerability. Where possible, local indicators need to be sourced and matched to each domain and factor.

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