



Strengths and Challenges Report

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1 Introduction

We as Tarnagulla community wish to ensure that we can maintain a thriving future and prevent undesirable future trajectories in context of the many challenges, including climate change. In order for us to better adapt into the future and not leave our future to chance or to others, we intend to develop a suite of tailored actions for our town, to proactively and continually develop our capacities to build our collective, individual and institutional resilience.

This document reports on Tarnagulla community as a place-based community's identified strengths, capacities and the challenges. This document first sets out why the town and its people set out to develop a resilience action plan, followed by the method used. Our strengths in form of five capital forms, challenges (general and climate-related), capacities and our long-term vision are articulated, followed by discussion of what would follow this report. This report is an initial step towards developing our own resilience action plan in collaboration with researcher from RMIT's Climate Change Transformations group.

2 Why do we want a resilience action plan?

The Tarnagulla community, like many other rural and regional communities, face many challenges, including a changing climate. Some of the ongoing challenges facing Tarnagulla include a shrinking and aging population, unreliable electricity, long distances from business opportunities, lack of adequate public transportation, lack of medical facilities, and high risks of bushfires, occasional floods, droughts, and storms.

Community connection, happiness and wellbeing underlies Tarnagulla's vision for developing their "resilience" action plan. This kind of 'social capital' is something the literature and international best practice repeatedly shows as crucial to building resilience.



Photos (Source: Mittul Vahanvati)

3 How was this plan developed?

A co-production methodology and theoretical framework for "community resilience" developed by the International Federation of Red Cross and Red Crescent Society (IFRC 2012) is adopted for Tarnagulla community to proactively and voluntarily produce their own strengths and challenges report. A co-production methodology is found appropriate considering there is an international consensus that resilience cannot be imposed on a

community by external stakeholders and that communities have assets, skills and capacities, not only deficits.

Community resilience is reliant on five themes as per IFRC (2012) (Figure 1) as:

- i. basic needs (one cannot talk about resilience to those who barely manage to sustain),
- ii. assets (owned by individuals/ community - physical, natural, financial, social and human),
- iii. resources (external assistance from local government or NGOs),
- iv. qualities of those assets (robust, diverse, well-located, equitable, redundant) and
- v. capacities of community (to adapt to change, to self-organise, act and learn from experience and to mobilise their assets and resources when needed)



Figure 2: A conceptual framework for community resilience

Figure 1: A conceptual framework for community resilience (source: International Federation of Red Cross and Red Crescent Societies (IFRC, 2012).

Strengths were identified by the Tarnagulla community in terms of five 'capital forms' listed under the community resilience framework (IFRC, 2012) to incorporate a broader, more integrative considerations of (see section 4 for more details):

- i. Human capital (knowledgeable, healthy, learn new skills and build on experience)
- ii. Social capital (organised to identify problems, establish priorities and act; connected with external actors)
- iii. Economic assets (resourceful, diverse range of employment and livelihood opportunities)
- iv. Physical capital (robust housing, services and infrastructure – things built by humans)
- v. Natural capital (the ability to protect, maintain and enhance environmental features and tangible natural resources such as agricultural land, rivers, bush etc. that yield ecosystem services)

Challenges facing us, like many rural and regional communities, are many, including 'general' developmental challenges and 'climate-related' challenges. These challenges are identified through following approaches (see section 5 for more details): i) historic timeline based on community observations, ii) climate projections based on scientific data and iii) vulnerability analysis. While the future is uncertain and is best not gauged from the past, the development of a historic timeline was used to identify patterns in relation to past climate extreme events – what worked, what did not, what experiences shaped the current day Tarnagulla and the potential of these experiences to constrain or enhance future efforts. Historic observations of community were combined with scientific data on climate projections to develop three potential climate scenarios, two of which were 'tough/ dire' while the third

was 'visionary and ideal'. These scenarios allowed us to understand the potential implications or challenges we might face. To add to the complexity we also identified who, where and what was most vulnerable to the impacts of climate change.

Our capacities – individual, collective and institutional – to cope, recover, adapt and transform, to meet the needs of the changing circumstances, were assessed in context of 'general' and climate-related challenges, against five capital forms.

To bring all the understanding of our strengths, challenges and capacities together, three horizons approach was used (see section 7.3 for more details).

4 What are our existing strengths, assets and capacities?

An asset-based community development (ABCD) approach, which is used in development projects, is found appropriate to identify our existing strengths and capacities. For identifying human and social capital the 5H approach proposed by the ABCD institute was used.

Table 1: Various capitals as strengths within Tarnagulla community

Human capital	Social capital	Physical capital	Natural capital	Economic capital
				
Teaching/education (maths, music)	Senior citizens (1981)	Pub	Conservation reserve (Mallee)	Hotel
Empowerment (youth engagement)	South Loddon tourism group	Historic precinct with heritage value buildings	Historic mining (fossicking)	Post office
Technical skills (woodwork, metal work)	Tarnagulla development group	Community hall	Swimming hole	Bed and Breakfast
Making (knitting, cooking, spinning wool, soap)	Parks and recreation group	Library	Unique heat & drought tolerant Goldfields Grevillia tree	
Land-care and conservation (natural history, bird watching, gardening)	Tarnagulla Action group	Post office	Wildlife – flora and fauna	
Local history	Neighbourhood watch	Res (caravan camping area)	Reservoir (fishing)	
Management (emergency, risk mitigation)	Tarnagulla Alternative Energy group (TAEG)	Walking and bicycle riding tracks (biking every year)	Bicycle track	
Health and wellness	Neighbourhood watch	Only one bus stop		
Caring for fur-babies	CFA	Sports facilities (tennis court, cricket ground, golf course)		
Support and network; administration	Golf Club			
	School	NBN		
	Cemetery trust	Soldiers Memorial Park		

The 5Hs are “Head, Hand, Heart, Heel and Human connection”. We reflected on things we know about and would love talking about to others (head), things we are skilled at (hand), things we deeply care about (heart), things that make us feel grounded (heel) and the things we all do to stay connected with our community (human connection). This exercise was followed by identification of other forms of capitals as our town’s strengths (Table 1).

Human capital and social capital are strongest in Tarnagulla, with highly skilled individuals as well as great sense of community and ability for collective action. The physical capital includes historic buildings, which everyone is very proud of. A lot of us have emotional connection to some of these historic buildings e.g. church. Natural capital includes remnants of gold mining (which is under management status now), bush with drought tolerant trees, mountain biking tracks and unique flora-fauna of Box Ironbark country. However, as seen in the table, the economic capital is low and at high risk of reducing further.

5 What are our ‘general’ and climate change related challenges?

Challenges facing us, like many rural and regional communities, are many. There are ‘general’ developmental challenges that have accumulated over time and experienced presently or, are climate-change related challenges, which are termed as vulnerabilities (see section 5.5 for more details).

5.1 What are the ‘general’ challenges we face currently and in future if we continue ‘business-as-usual’?

Our present situation is illustrated in infographics (Figure 2). Nevertheless, not all of them are challenges. As highlighted in the figure, some of our ‘general’ challenges include:

- Physical capital
 - o derelict homes, footpaths and unoccupied houses (>30%),
 - o limited access to health care facilities,
 - o insecure power and water infrastructure
 - o limited things to do in town e.g. kids could play themselves but no more
 - o lack of attraction of town
- Economic capital
 - o local business decreasing
 - o only approximately 40% population having full-time employment and approximately 35% part-time
 - o 1/3rd of population occupied in providing care
- Human capital
 - o aging population
 - o decreasing population – it is a general societal change – there were a lot of children (72 in olden times), younger generation leaves and hardly return; there is need for more people
- Natural capital
 - o loss of flora and fauna which is also linked to a general trend of increase in temperature, regular pest infestations (e.g. caterpillar, locust etc.), which may make bush recovery challenging
- Social capital
 - o many community organisations but with limited connection

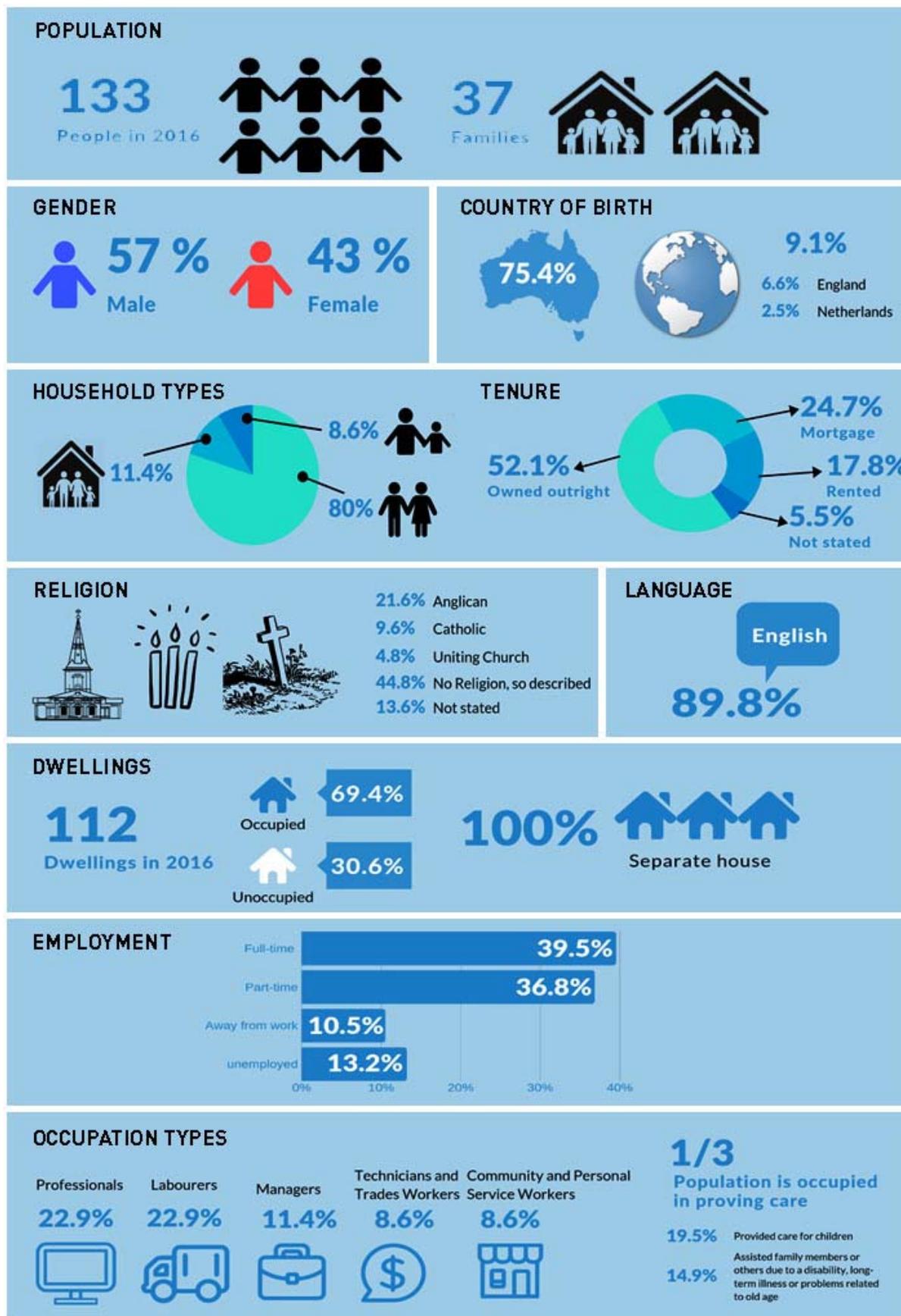


Figure 2: Infographic about 'general' challenges facing Tarnagulla community (Source: Mittul Vahanvati with help from Sitong Wei)

5.2 Historic timeline

An understanding of the historical evolution of the system is essential for understanding system patterns in terms of, some of the stable times, times of system collapse, how the past events have helped or hindered the capacities of Tarnagulla community to adapt and respond to uncertainties. Historic understanding will help us understand the current dynamics and the potential future trajectory of our system i.e. resilience of Tarnagulla community.



Figure 3: Historic timeline workshop (Source: Mittul Vahanvati)

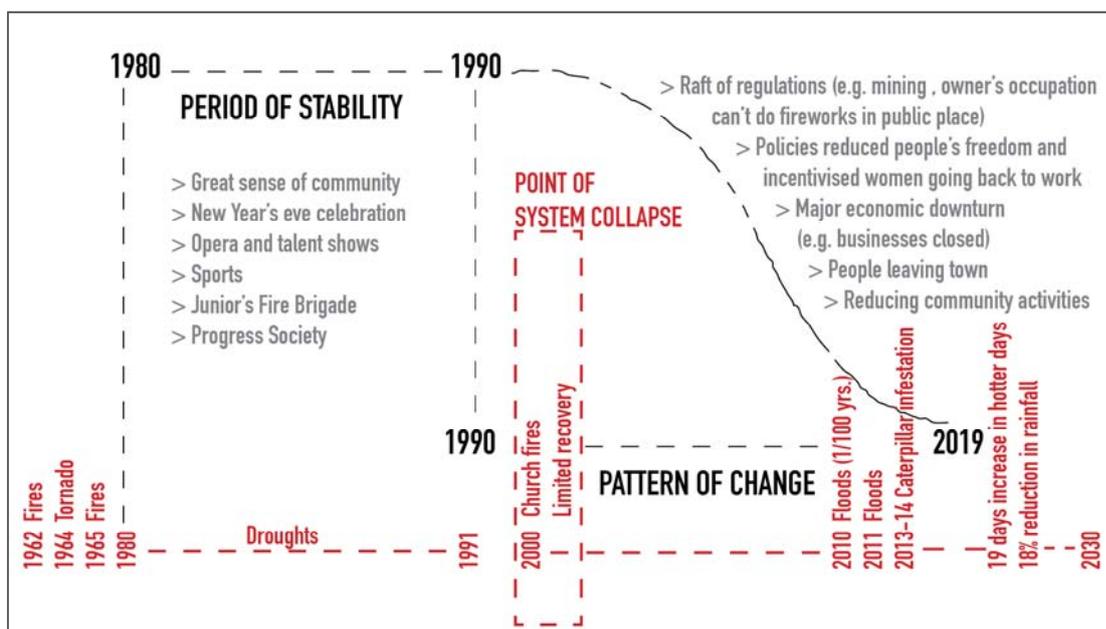


Figure 4: Patterns emerging from historical timeline (Source: Mittul Vahanvati)

Few patterns have emerged from the historic timeline workshop, as:

- **Periods of stability**
 - o early 1980s to 1990s – great sense of community and activities like, fireman’s ball, sports, junior fire brigade, progress society, New Year’s Eve celebration, millennial celebration
- **Points of collapse – 2000**
 - o Drought lasted for 9 years (1980-1990) due to lack of rain
 - o Fire in 2000 (35 years after last significant fire)
- **Conditions leading up to the collapse/ event (patterns of change since 1990s)–**
 - o Natural resource (e.g. mining) retrieving too expensive forcing mine closure
 - o Policies and regulations (e.g. mining, owner’s occupation etc.) which made things harder and harder, causing businesses to close and reducing of community activities
 - o Economic downturn 1980-1990s – butcher shop closed, grocery store closed, pub closed, caravan park stopped selling fuel, mainly because mining went into maintenance in 2010, which led to:
 - People left town
 - Couples started going to work to meet the increasing cost of living (e.g. increasing interest rate, policies as paid parental leave encouraged working women)
 - Community spirit and freedom to be active in public space reduced (e.g. can’t do fireworks in public, cannot speed causing closure of biking etc.)
 - o Growing concern of climate-related hazards or extreme weather events e.g. lack of rain, fires, heat waves, floods (concerns with dam bursting)
- **Reflections – what worked, what was missing during emergency response and recovery –**
 - o Great sadness in town after 1st July 2000, when a fire at the Wesleyan Methodist Church took the life of a Fireman.
 - o Everyone went about their lives after the 2000 fire, but many have not recovered (psychologically and emotionally) due to loss of life of valued community member
 - o Lot of emergency management people came to support which was great
 - o The golf club went downhill after a valued community member’s passing, but now there is resurgence
 - o We feel that we do not have political voice when it comes to climate resilience

5.3 What are the climate change related challenges we face?

Although the general trajectory of a warming climate is clear, precisely how that may manifest in future is unclear because of its interactions with ecological, social, and economic systems. Therefore, planning for a single future is a high-risk strategy. To avoid this, we combined two views to understand what challenges we face and what we consider to be most vulnerable in our community. These views were:

- i) Observations from historical timeline – thinking about the past to understand historic evolution of the system, and the legacy of past events that has shaped current dynamics of system
- ii) Climate Change projections – based on scientific data

The data from historic timeline is combined with Climate Change projections from the Victorian government, Northern Victorian Emergency management cluster and Loddon Mallee Council (Table 2). Impacts from past events are also noted to identify which extreme events pose biggest threat level to our town and community.

Table 2: Climate change observation (Source: DELWP 2015; NCCMA & Water Technology Pty Ltd 2014; NVEMCluster & State Government of Victoria 2018)

Historic trends		Climate Change projections	Impacts
Individual observation	Regional data		
Heat waves > 40°C days	<ul style="list-style-type: none"> ▪ Current average number of hot days over 35°C = 13days ▪ Av. temperatures has increased by 1.2-1.4 °C in the southern part of the Loddon Mallee since 1950 	<ul style="list-style-type: none"> ▪ Higher temperature -Annual Av. temp. increase by 1 °C (2030), 1.6 -2.7 °C (2070) ▪ More number of hotter (>35°C) days - No of hot days to increase by 19 days (2030), 23-29 days (2070) 	<ul style="list-style-type: none"> ▪ Power outages getting longer and more frequent ▪ Increasing cost of cooling house
Fires (rapid onset disasters) <ul style="list-style-type: none"> ▪ 1962 Hotel fire ▪ 1965 Major fire ▪ 2000 Church fire 		<ul style="list-style-type: none"> ▪ Harsher and longer fire season 	<ul style="list-style-type: none"> ▪ Post- 1962 hotel bar and dining rebuilt, but major loss of life after 1965 ▪ Junior Fire Brigade opened in 1985, but closed now ▪ CFA resurgence ▪ No psychological recovery after the 2000 fire
Precipitation & floods <ul style="list-style-type: none"> ▪ Lower rainfall ▪ 2010 floods were 1/100 years severe ▪ 2011 floods 	<ul style="list-style-type: none"> ▪ Rainfall reduced by 0-100 mm, and southern Loddon Mallee region reduced by 100-200 mm since 1950 ▪ 2011 rainfall (204 mm) 	<ul style="list-style-type: none"> ▪ No rainfall or extreme downpours ▪ More frequency and intensity of rainfall 	<ul style="list-style-type: none"> ▪ Concerns about dam busting and houses flooding after 2010 ▪ No potable water for 5 days, 2010 ▪ Town had to buy water ▪ Rainwater tanks helped
Droughts <ul style="list-style-type: none"> ▪ 1982 – 1991 (9 years long) 	<ul style="list-style-type: none"> ▪ 1996 – 2009 (13 years long) ▪ the Loddon Mallee region’s harshest Millennium Drought 	<ul style="list-style-type: none"> ▪ Longer and frequent droughts ▪ Projected reduction in annual average rainfall (%) for Loddon Mallee: 18% (by 2030); 23% to 30% (by 2070) 	<ul style="list-style-type: none"> ▪ Challenges with water and farming ▪ Caterpillar infestation in trees causing two seasons of no leaves (2013-14)

5.4 Three potential future scenarios

By combining observations from historic experiences (local knowledge) with future climate projections (scientific knowledge), we created three probable future scenarios, as shown in Table 3. These scenarios are developed by us, based on potential risk and impact level.

Table 3: Three future climate scenarios

Potential Future Scenario	Potential implications discussed
Scenario 1 (High Risk) <ul style="list-style-type: none"> ▪ Heat wave ▪ Transport disruption ▪ Power / Energy outage ▪ Health care system in stress 	<ul style="list-style-type: none"> ▪ Deaths and health related injuries caused by long term heat stress, especially of vulnerable community ▪ Lack of access to groceries ▪ Disruption to heating and cooling facilities ▪ Disruption to communication facilities ▪ Disruption to transport, necessary for accessing health care services ▪ Shortage of portable water ▪ Shortage of food ▪ Decline in mental health ▪ Economic stress due to increase in cost of living and livelihood reduction (especially in primary production) ▪ Pest infestations causing tree recovery challenging
Scenario 2 (Moderate-High Risk) <ul style="list-style-type: none"> ▪ Extended drought ▪ Fire ▪ Lack of water ▪ Psychological impact 	<ul style="list-style-type: none"> ▪ Same as above ▪ Economic stress due to recovery of restoration of damaged house and services
Scenario 3 (Ideal – No Risk) <ul style="list-style-type: none"> ▪ Renewable energy (leadership) ▪ Explore adaption / learning to live with changing nature (innovation) ▪ Drought – proofing farm (mullion instil) ▪ Community coming together 	<ul style="list-style-type: none"> ▪ Resilient community ▪ Support for and by community members ▪ Adaptable community ▪ Celebration of strengths within the town ▪ Innovation in economic activity and livelihood ▪ Positive outlook of Tarnagulla town (climate adapted and robust housing and infrastructure) ▪ Self-sufficiency for power ▪ Gain political voice

5.5 Who, where and what is most vulnerable?

Vulnerability is defined as “the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards” (UNISDR 2017, p. 24).

Vulnerability is thus determined by: i) the susceptibility or sensitivity of people, place and assets, ii) their exposure to climate-related extreme weather events and iii) lack of ‘capacity’ or capacity deficit (Handmer 2003; McEvoy, Fünfgeld & Bosomworth 2013).

The susceptible people and assets (who and what), exposed locations (where) are classified as per the five capital forms in Table 4, whereas, capacity and capacity deficits are noted in Table 5.

Table 4: Climate change related vulnerabilities in Tarnagulla

Capital forms	Vulnerable people, places, institutions in Tarnagulla
Human capital	<ul style="list-style-type: none"> ▪ Elderly (over 65 years old) 43.8 % of population ▪ Children (0-14 years old) 7.4 % of population ▪ Low income households (42.9%) with less than \$650 gross weekly income
Social capital	<ul style="list-style-type: none"> ▪ Community centres as they can act as emergency refuge but needs renovation ▪ Tarnagulla Recreation Reserve concerns ▪ Swimming hole concerns with low rain ▪ CFA future ▪ Police future
Economic capital	<ul style="list-style-type: none"> ▪ Agriculture / Primary productions ▪ Farmers, animal industries, farm workers ▪ Local businesses - local shop, post office ▪ Economic stress of maintaining houses, most of which have heritage overlay
Physical capital	<ul style="list-style-type: none"> ▪ Housing condition deteriorating and not designed or built for climate adaptation, e.g. some houses have asbestos, predominantly timber-framed houses with no ember protection design, and surrounded with flammable materials ▪ Median house price = \$175,499, and would decrease with a warming climate ▪ Infrastructure e.g. roads rutting and cracking affecting transport ▪ Stress on health care services from increasing incidences of trauma, health etc. ▪ Uncertain water security (maybe in 2-3 yrs we may have piped water) ▪ Energy future – lots of brown outs or black outs (5 days of outage in the last month), which can disrupt internet, school, healthcare and have implications on house heating/cooling ▪ No emergency shelter or evacuation plan
Natural capital	<ul style="list-style-type: none"> ▪ Damage to environmental sites e.g. recreation reserve, swimming hole ▪ Flora-fauna e.g. early flowering, pest infestation ▪ Erosion from floods ▪ Pest infestations

6 What capacities do we have to adapt to a changing climate?

Capacities is defined as “the combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience” (UNISDR 2017, p. 12). While we have already identified our strengths in form of five capital forms in ‘general’ circumstance, we have not assessed their qualities. As per IFRC (2012) community resilience framework, it is the capacities and the qualities of each capital form, which determines the resilience of communities and system. Qualities of capital forms include robustness, well-located (housing and physical infrastructure), equitable (economic capital, resourcefulness), diverse (social capital), ability to learn and adapt to a changing future (human capital) and redundant (Table 5).

Table 5: Adaptive capacities assessment (Source: Adapted from UN-Habitat 2014) Red highlights are high risk due to capacity deficits, while orange highlights are moderate.

Human capital (individual skills & capacity)	Yes	No	Why
Are you aware of a) climate change and b) potential impacts/ risks in your area?	✓		We live with and witness climate change impacts
Have you applied your skills to address or respond to climate hazard/ impacts?	✓		Fires, floods etc.
Have you undertaken skills training or workshop to learn about ways to address/ mitigate climate change impacts?	✓		Permaculture, food swap etc.
Are there trained emergency response/ management teams in your town?	✓		CFA, Senior citizens
Is there an ability to communicate with all affected people in town during an extreme event (e.g. evacuation plan, a designated key point of contact, basic radio and regular interaction etc.)		✗	½ hr to do door knocking No Evacuation Plan Not everyone has radios and mobile phones run out of battery if no power
Are local stakeholders aware of risks from climate change?	✓		Farmers' Council
Social capital (collective capacity)			
Is there diversity and cohesion in community?	~		Diversity yes; Cohesion no
Have you coped well with past extreme weather events?	✓		▪ 1964 Tornado, 1965 fires; 1980-1991 drought; 2000 church fire; 1/100 yrs.); 2011 floods; 2013-14 Caterpillar infestation
Are there notable community/neighbourhood "leaders" that can quickly organize people in the event of extreme weather event?	✓		Longstanding eldest citizens, CFA, Parks and recreation group, Neighbourhood watch, Cemetery trust
Is there political willingness to allocate resources to build adaptive capacity?	~		State government funding; but no support from local Council for climate resilience; federal electoral boundary changed recently
Are there any specific agencies, community groups and/or NGOs that have the mandate and skills to support Tarnagulla's climate resilience?	✓		DELWP, EMV, TAEG
Economic capital			
Do you have access to adequate financial resources and funding?		✗	Approx. 60-70% live from pension to pension
Have you managed to diversify your livelihood to meet the needs of a changing climate?	✓		Many people have diversified livelihood e.g. bed and breakfast, farming pigs + sheep; full time job + other jobs
Do you have resources to respond to a climate related hazard or extreme weather event (e.g. access to basic transportation, adequate ration, ability to relocate temporarily, basic shelter)?	~		Yes, but would need external support (financial, logistical)
Do you have adequate time to plan and implement adaptation actions?	✓		
Physical capital			
Is your house robust to withstand extreme weather events?		✗	Various housing from Federation to 1960s houses, not built for fires (not designed for keeping ambers out); or tornadoes; House insurance very high
Is there adequate transport?		✗	Bus to Bendigo only once/week Bus to Adelaide Community bus in Inglewood and Maryborough, but not Tarnagulla
Is there adequate water infrastructure?		✗	Current piped water is from

			Laanecoorie and gravity fed; maybe in 2-3 years we may be connected to the Wimmera Mallee Pipeline
Is there adequate sanitation?	✓		Septic tanks – that is only economically feasible solution
Is there adequate energy supply and management?		✗	Too many power outages
Are major infrastructure and/or facilities located in hazard prone areas?	✓		NBN tower, Telstra tower
Are there adequate medical services in proximity?		✗	<ul style="list-style-type: none"> ▪ Nearest hospital is 15km away in Dunolly, otherwise 23km to Inglewood or 46km to Bendigo Base Hospital or St John of God. ▪ Ambulance can take up to 45 mins to arrive from Inglewood ▪ Have defibrillator at the Public Hall
Did you manage to retain access to safe, clean, drinking water in the event of a hazard occurrence?	✓		Many people have rainwater tanks
Natural capital			
Is local vegetation drought and heat tolerant?	✓		One Grevillia species is drought tolerant
Is local bush fire resistant?	✓		Local vegetation not prone to many ember attacks
Has local flora coped with pest infestations?	✓		<ul style="list-style-type: none"> ▪ Trees recovered after 2 seasons of no leaves from 2013-14 caterpillar infestation; but if such infestations happened for longer the trees may not recover ▪ Locust infestation (every 5-10 years)

It is highlighted in the table that the physical capital (housing, transport, energy and water infrastructure and health care facilities) have the least capacity to cope with a changing climate or weather extremities, followed by economic capital (livelihood, funding) and human capital (aging population and political voice). The social and natural capitals have highest capacity, reflected in the bush recovering after two seasons of being leaf-less.

7 Where to now?

7.1 Long-term vision for Tarnagulla

The Tarnagulla community identified their vision for the future as:

*“The Tarnagulla community of the future will be different, and together we will work towards developing and sustaining a thriving town. We will have a **strong social culture** built on a diverse and connected population representing and welcoming peoples of all ages, status, ethnicities and interests. We will have a beautiful town with a **sustainable economy** built on local agriculture, businesses, clubs, organisations and tourism. To **be resilient** we will have developed the necessary capabilities to confidently address our future.”*

The vision highlights that retaining and strengthening a sense of community is of utmost importance to the Tarnagulla community. A few community members said, “we want to attract more people and business to town and stabilise the town from further decline”. We intend to forge a sustainable economy and resilient future, collectively.

7.2 What we value and wish to retain?

To achieve the future vision, our existing strengths needed to be aligned to address the challenges facing us. We looked at what we as community valued the most, which we would like to retain while planning for future. The things we value the most are:

- Community spirit and activities (active socialising place) are already returning
- Community diversity is good, and would like to retain such diversity (even welcome refugees)
- Peace and quiet
- Recreation Reserve camping
- CFA progression and resurgence
- School (has 34 students which is positive)
- Businesses – Res, B&B's, Pub, Golf club resurging
- Natural asset conservation
- Heritage look of houses but renovate them and make town attractive

7.3 Three horizons approach – to identify capacity gap and to carve a pathway from present to desired futures

Three horizons chart, developed by the International Futures Forum (IIF) was used for bringing together our strengths, challenges and potential opportunities, the past, the present and desired future. By bringing them together, a multi-dimensional jigsaw emerged (Table 6). Three horizons are about describing three patterns of activities and how their interactions play out over time.

First Horizon (Red) – H1 – is the dominant system at present. It represents 'business as usual'. We rely on these systems being stable and reliable but as the world changes, so aspects of business as usual begin to feel out of place or no longer fit for purpose. We note all our strengths, challenges, vulnerabilities and concerns here.

Third Horizon (Blue) – H3 – emerges as the long-term vision or successor to business-as-usual. It may be prevalent on the fringes in the present but may feel like doing things in a completely new way. Yet, it turns out to be much better fitted to the world that is emerging than the dominant H1 systems.

Table 6: Three horizons approach to mapping activities from present to a desired future (Source: Mittul Vahanvati)

General challenges and strengths	Horizon 1 Present dominant system and concerns (from Figures 2 and 4)	Horizon 2 Transition activities/change	Horizon 3 Vision for the long-term
Human capital	<ul style="list-style-type: none"> ▪ Susceptibility of aging population (43.8 % elderly >65 yrs old), children <14yrs old (7.4 %) and low-income households with less than \$650 gross weekly income (42.9%) ▪ Decrease in population (e.g. weekenders, people moving away) ▪ Lack of knowledge, willingness, access to and/or ability to use or share data on vulnerability or to plan for climate adaptation 	Action planning (next report)	<ul style="list-style-type: none"> ▪ Knowledgeable and able to plan for climate change ▪ Increase in population

Social capital	<ul style="list-style-type: none"> ▪ Lack of participation, leadership, decision and management for modes of governance ▪ Multiple committees but limited connection ▪ Reviving sense of community ▪ Lack of amenities e.g. health care services, hospital, high school 		<ul style="list-style-type: none"> ▪ Ability to take collective action, shares skills, support and care for each other ▪ Voice is heard by government ▪ Good working relationship with local Council, NGOs and non-profit
Economic capital	<ul style="list-style-type: none"> ▪ Low-income group (\$650 gross weekly income of 43%) due to reliance on primary production, remoteness and increasing fuel cost ▪ Farm businesses at high risk 		<ul style="list-style-type: none"> ▪ Thriving and diversified local economy
Physical capital	<ul style="list-style-type: none"> ▪ Remoteness of location ▪ Energy failure or inability to cope the increased cost of energy ▪ Lack of attraction to town, little reason to stop or visit 		<ul style="list-style-type: none"> ▪ Self-sufficient electricity ▪ Close relationship with nature and land promoting the history and preserving architecture
Natural capital	<ul style="list-style-type: none"> ▪ Damage to environmental sites e.g. recreation reserve, swimming hole ▪ Pest infestations e.g. 2013-14 caterpillar infestation, locust infestation every 5-10 years and plague infestation 10 years ago ▪ Lack of firewood for heating 		<ul style="list-style-type: none"> ▪ Conservation of environmental sites ▪ Policing of coup realised for firewood collection so that locals get it, not outsiders
Climate change related challenges (from Tables 2 and 4)			
Heat waves, Bushfires Flooding Drought Frost Tornados	<ul style="list-style-type: none"> ▪ Psychological and mental health effects ▪ Stress on health and emergency services – injuries, disease ▪ Economic stress due to low economic adaptation capability - livelihood; unemployment and reduction in income in primary industries (e.g. lack of food production, pasture growth, cattle) ▪ Housing, infrastructure (roads, dam, transport) and services (water, sanitation, energy) not designed, built or managed to be climate adaptable ▪ Loss of flora and fauna (biodiversity), earlier flowering and planting times ▪ Declining CFA and police staff ▪ Junior Fire Brigade closed (opened in 1985) ▪ Lack of emergency shelter/ evacuation plan ▪ Lack political voice/ institutional support 	Action planning (next report)	<ul style="list-style-type: none"> ▪ Skilled in sharing of data e.g. for drought proofing farms ▪ Adequate healthcare services and transport infrastructure ▪ Adequate internal financial capital and external support for climate adaptation actions ▪ Well designed, constructed, sited and managed houses, infrastructure and services to be resilient to climate extremes/ hazards ▪ Drought tolerant and heat resilient trees and food production/ consumption ▪ Farmland adapted to changing conditions ▪ Need a clear evacuation plan, emergency shelter, a designated key point of contact, basic radio, regular interaction etc.

Second Horizon (Green) – H2 - is a pattern of transition activities and innovations, people trying things out in response to the ways in which the landscape is changing. In essence,

horizon 2 is about actions or changes put in place after trial and error to reach desired horizon 3.

7.4 Next steps

There will be another series of workshops to focus on developing priority actions for Tarnagulla to build upon its various strengths and capacities to build long-term community resilience. These workshops include: i) action planning, ii) citizen jury and iii) stakeholder workshop. The actions determined during action planning workshop will be put in horizon 2 to assess whether they would lead to building individual, collective, town's and institutional capacities for attaining the future we desire. Through 'citizen jury' workshop, we as Tarnagulla citizens will be able to discuss and cast our three votes to the actions, we think are most important. The actions which gets maximum votes will be democratically selected to be of highest priority. These priority actions will be tested with a few stakeholders (e.g. Emergency Management Victoria, DELWP, CPA, Loddon Shire Council etc.) to understand how feasible these ideas are to implement, and how aligned they are to achieve a long-term vision of being resilient. The findings from these workshops will form our priority action plan for building resilience and our next and final report.

8 Measurable outcomes from Strengths and Challenges workshops

Some of the outcomes of the series of collaborative workshops are listed in terms of participation (quantitative), endorsement (qualitative and quantitative) and anecdotes (qualitative).

8.1 Participation:

- 68 attendees during project launch
 - 20 community members attended the 1st strengths workshop (including Councillor Geoff Curnow from Tarnagulla Ward. While the attendance was low, continued participation of Councillor is a good sign of local authorities' interest in this project.
 - 17 community members attended 2nd strengths workshop
 - 20 community members attended 3rd challenges and climate scenario workshop
- In total 125 members attended the project launch event and workshops.

8.2 Endorsement

- 25 survey responses about meaning of resilience
- 10 survey responses on community's understanding of strengths and challenges

60% respondents 'strongly agreed' and 30% 'agreed' that attending the workshops has increased their understanding of Tarnagulla community's various strengths and potential future challenges in context of climate change. Thus, almost 90% of community endorsed their improvement in understand of individual, collective and town's strengths and challenges at the end of phase 2 of project.

8.3 Anecdotes

Feedback and acknowledgement provided by Tarnagulla community, which demonstrates their improved understanding of the strengths and challenges to address climate change, during workshops and surveys are listed.

- "When I was a child there were 31,000 people (during 1931) in town"

- “I am newest to Tarnagulla. When I arrived in 6 months ago, it took me only a couple of days to know everybody.”
- “I’m very pleased that I moved here, nice, peaceful township. And people very friendly.”
- “I have a better understanding of some of the people who live here, and am understanding more about the town itself, where it has come from, how it has developed, and what it needs to do to continue to exist as a community”
- “The information in the workshops has given me a much better understanding of climate change and the effects it would have on our town as most of my prior thinking was from living in a much bigger town/city.”
- “I do not believe that we are competing with climate change, but we do have a problem with people mixing.”
- “I understand more, I am aware of more options, I am more open to information and suggestions”
- “Pleasant awareness of importance of climate change”
- “Build the community spirit of the town collectively and to work towards becoming a self-sustainable town”
- “It was great to delve into what people saw as important to them/the town...It was good to think about what changes we might see in the future.”

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10 Resources

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<https://www.homeaffairs.gov.au/emergency/files/national-strategy-disaster-resilience.pdf>
- Regional Climate Change Explorer -
<http://www.climatechangeinaustralia.gov.au/en/climateprojections/future-climate/regional-climate-change-explorer/super-clusters/>
- Climate Ready Victoria – Loddon Mallee Region -
http://www.climatechange.vic.gov.au/data/assets/pdf_file/0003/320889/Loddon-Mallee.pdf
- Heatwave Planning Resources – Department of Health and Human Services -
<https://www2.health.vic.gov.au/public-health/environmental-health/climateweather-and-public-health/heatwaves-and-extreme-heat/heatwave-planning>
- State Heat health plan -
<https://www2.health.vic.gov.au/Api/downloadmedia/%7B5151AA4ED2FD-4DD8-AA58-3F74A63F2066%7D>
- Central Victorian Greenhouse Alliance
Heatwave training video - <https://heathealth.cvga.org.au/heatwave-help-downloads/>
Heatwave Help- <https://heathealth.cvga.org.au/>
- Emergency Management Victoria - <https://www.emv.vic.gov.au/>
- State Heat Plan - <http://files.em.vic.gov.au/EMV-web/State-Heat-Plan.pdf>
- Interim State Emergency Response Plan Extreme Heat Sub-Plan -
<http://files.portal.em.vic.gov.au/refdocs/EMK-01.19-HeatSubplan.pdf>
- Emergency Management Common Operating Picture (EMCOP) -
<http://app.prod.cop.em.vic.gov.au/sadisplay/nicslogin.seam>
- Vic Emergency Website - Public emergency warning service -
<http://emergency.vic.gov.au/respond/>