Griffith UNIVERSITY
Queensland, Australia

Cities Research Institute

Towards local food resilience

Key considerations for building local food resilience and contingency plans: A focus on the Cairns region

Final Report

26 March 2021

Acknowledgement of Country

Griffith University acknowledges the people who are the traditional custodians of the land, pays respect to the Elders, past and present, and extends that respect to other Aboriginal and Torres Strait Islander Peoples. We acknowledge the Traditional Owners: the Djabugay, Gunggandji, Yidinji, and Yirrganydji, on whose lands are the places of study in this report.

Map 1: Traditional Owners, Cairns region

Source: terrain.org.au (2016).

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This report is a project deliverable, and informs an academic journal publication underway, which provides more detail regarding the methods used, analysis and synthesis of findings.

Partners

Cairns Regional Council Disaster Management Unit

Cities Research Institute, Griffith University

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Acronyms

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
BOM	Bureau of Meteorology
CALD	Culturally and Linguistically Diverse
CRC	Cairns Regional Council
CRC-DMU	Cairns Regional Council Disaster Management Unit
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DMU	Disaster Management Unit
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
FAO	Food and Agricultural Organisation of the United Nations
FNQ	Far North Queensland
ICLEI	Local Governments for Sustainability
IGEM	Inspector-General Emergency Management
LDMG	Local Disaster Management Group
QCOSS	Queensland Council of Social Services
QRA	Queensland Reconstruction Authority
SFSC	Short Food Supply Chains
UNDRR	United Nations Office for Disaster Risk Reduction

Glossary

Culturally and Linguistically Diverse (CALD)	"Culturally and linguistically diverse is a term used to capture people who were born in a country outside of Australia, whose language and/or culture are different to that which dominates in Australia" (Millichamp & Gallegos, 2011, p. 4).
Resilience	"Improvements in the capacity and capability of a community to prepare, respond and recover from a disaster event" (Queensland Reconstruction Authority, 2017, p. 7).
Food security	"Food security exists when all people, at all times, have physical and economic access to *sufficient*, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1994, para 1).
Vulnerable	"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." (United Nations Office for Disaster Risk Reduction, 2021b, para 1).
Disaster risk	The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined as a function of hazard, exposure, vulnerability and capacity (United Nations Office for Disaster Risk Reduction, 2021a, para 1).

Executive summary

This report has explored the question, '*How can vulnerable communities improve their resilience to future disasters through access to locally-produced food?*'. The profile of continuing food disadvantage in the Cairns region includes citizens experiencing homelessness, aging, youth, disabilities, Indigeneity and Islander identity, and culturally and linguistically diverse (CALD) communities. The line between the 'most vulnerable' who experience every-day chronic conditions of food insecurity, and those who, previous to COVID-19, only experienced transitory food insecurity, is becoming more blurred. With increasing casualisation of the workforce, reliance on food aid is becoming more commonplace. The Cairns regions shares these experiences with the Australian nation.

The Cairns context is unique in that the region is geographically situated in the tropical cyclone highway and prone to flooding, cyclones, storm surge and heatwaves. We know that the bulk of Cairns' food is not grown in the Far North Queensland (FNQ) area, placing high reliance on everyday staples to be transported into the region. We also know of the history of ongoing interruptions to food supplies across Queensland road infrastructure from severe weather events. Within Australia, Cairns is also culturally unique as the region is home to a high percentage of Indigenous and Torres Straight Islanders. It also has higher incidences of food disadvantage compared to the national profile. The United Nations Food and Agriculture Organisation (FAO) advises that "countries should meet the needs of the most vulnerable people, as the measures to contain the pandemic cripple the economy" (2020, p. 1).

Cairns is also unique as a *UNDRR Role Model City* with a demonstrated and internationally acknowledged commitment to building the region's resilience to disaster risks and impacts. Through an acknowledgement of disaster 'near misses', the Cairns Regional Council Disaster Management Unit (CRC-DMU) has identified through its *Disaster Resilience Strategy*, the need to champion a holistic and integrative approach to food contingency.

Drawing on literature, survey, workshop findings and expert review input, five key considerations for turning towards local food resilience are presented, namely:

1) *Acknowledging* the increasing local experiences of food insecurity;
2) *Recognising* food supply chains as critical infrastructure;
3) *Identifying* food supply chain vulnerabilities;
4) *Accommodating* the potential for compounding events; and
5) *Embedding* local food production within sustainability and resilience agendas.

Local governments in Australia share common features with the Cairns context in terms of focused priorities to support the most disadvantaged members in communities. All Queensland Councils have Local Disaster Management Groups (LDMGs) that can bring expertise, insight and meaningful action to this issue. Through our partnership with the Queensland Government's Office of the Inspector-General Emergency Management (IGEM), this report provides information to Councils of what can be achieved for building local food resilience and contingency arrangements and enable state-wide action among local Councils and community groups to anticipate times of food hardship and prepare for those times by accessing shorter and more locally-based food supply chains.

1 Introduction

Historically, floods, fire and drought have brought with them issues of food supply. More recently in addition to these weather events, COVID-19 has exposed our collective reliance on supermarkets for accessing food. Even if food is produced in a local region it is mostly harvested by foreign labour and is transported to centralised food markets, then transported back to the local supermarket. This type of 'long food supply chain' functions as long as the producers, harvesters, distributors, retailers and buyers can interact freely, however it is clear that other models are needed in the pursuit of resilient communities (Reis et al., 2020).

In Australia, our State and Territory leaders manage response coordination for emergency food re-supply. Alongside this governance structure it is also well known that where individuals and communities share responsibility for anticipatory actions, they recover more effectively from the impacts of severe weather events (Council of Australian Governments, 2011).

Furthermore, community reliance upon emergency relief such as food banks, food pantries and soup kitchens are signals that the food system is in stress (McEntee & Naumova, 2016).

Within this context, this report presents the results of a study into opportunities for enabling local food resilience, presenting several key considerations for building local food resilience and contingency plans. With a focus on the Cairns region it documents a review of the literature and includes insights regarding the socio-economic dimensions of food disadvantage. Crucial policy enablers are presented for advancing local food resilience and contingency plans. Next step possibilities for Cairns Regional Council are also presented, towards enabling local food resilience for their communities.

1.1 Our collaborative research agenda

Our research team at Griffith University's Cities Research Institute is investigating ways for the public and private sector to address food shortage problems. Our ambition within Queensland is to inform the creation of shorter food supply chains (SFSCs) to augment and enhance existing systems, and to support the development of a central online 'community of practice' that formalises local food resilience and contingency arrangements for townships and regions.

The platform vision is to enable real-time sharing of what can be achieved for building local food resilience and contingency arrangements and enable state-wide action among Councils and community groups to anticipate times of food hardship and prepare for those times by accessing shorter and more locally-based food supply chains.

Through community-led design and development, the platform will enable:

a) local food networks to post updates;

b) citizens to engage with and access food options in time of need; and

c) emergency management personnel to access live streaming of updates to support organised activities.

The overall project website and this pilot project can be accessed here:

Enabling community action for local food contingency

Cairns is the gateway to world heritage areas and tropical agriculture that are exposed to weather extremes such as monsoons and heatwaves. Our work with the Cairns Regional Council aims to build a culture of life-long learning for resilience by supporting the most vulnerable community members to strategically access a range of local foods.

griffith.edu.au/cities-research-institute/research/digital-earth-and-resilient-infrastructure/food-contingency

The scope of this pilot project was to demonstrate to Cairns Regional Council, how local food resilience and contingency arrangements could be integrated within the existing *Be Ready Cairns 2019–2024* (the '*Disaster Resilience Strategy*'). As a collaboration between Griffith University and the Cairns Regional Council Disaster Management Unit (CRC-DMU) and in liaison with the Queensland Government's Inspector General Emergency Management (IGEM), we partnered with the CRC-DMU to explore the strategy and engage with key stakeholders to evaluate key areas where a local food focus could improve outcomes for the region.

The *Disaster Resilience Strategy* is a five-year strategy that envisions disaster resilience as a collective responsibility, which is shared by all sectors of society, which aims for Cairns region communities to have knowledge and understanding of the impacts that natural disasters can have upon them. Furthermore, they should be empowered to undertake practical actions and preparations to look after themselves.

The document was prepared in consultation with Council staff, Local Disaster Management Group (LDMG) members, external partners, various stakeholders and community groups. It outlines key themes and priorities including the need for increased attention to food contingency planning and for those who are most vulnerable to food disadvantage. Critical factors identified in the strategy for becoming resilient include:

1) Building the adaptive capacity and capability of communities;
2) Enhancing the capacities for sharing responsibility; and
3) Utilising community networks and encouraging their collaboration and empowerment via the IAP2 public participation framework.

The role of shorter food supply chains in supporting disaster response and recovery is currently not well-researched but is starting to emerge. Local food contingency planning means devising a Plan B and a Plan C for accessing more of the food produced in our own regions more directly (Reis, 2019). According to research conducted by Reis et al. (2019), it is a form of food planning that is of growing interest in the area of Australian Disaster Risk Management (DRM).

Natural disaster perspective

"While natural disasters affect all Australians, regardless of background or status, they do not affect us all equally. People facing disadvantage, such as those in poverty, migrants, refugees, children, older people, people with disabilities, people who are homeless or transient, and people living in poor quality housing, are more vulnerable at all stages of a disaster—before, during, and after it strikes."

(Australia's National Climate Resilience and Adaptation Strategy, 2015, p. 66).

A priority for DRM is to facilitate shared control and responsibility with those who want it, and a key insight is to "tap into the human desire to express goodwill, connect with existing capacities in the community and harness the power of successful precedents. There is no need to reinvent the wheel, rather, community members need to know that they have permission to participate and express their goodwill" (Reis et al., 2019, p.14).

To enable shared responsibility, there is the need to facilitate local food procurement procedures that can then inform emergency management operations. It is a key element of Business Continuity Planning that formally sets out the plans for accessing food locally and regionally. This allows the core business of emergency management to work with the sustainability agenda of local Councils. More broadly, we can see a growing utility for SFSCs to address COVID-19 conditions such as the interruption of normal supplies due to border restrictions and labour shortages (Hobbs, 2020; Pulighe & Lupia, 2020). Food supply is a critical infrastructure and with unknown futures due to disaster events and possible ongoing lockdowns (Galanakis, 2020), SFSC highlight promising avenues to address this humanitarian issue (Bene, 2020).

1.2 Global and local recent events

Compounding food supply concerns is the advent of the COVID-19 pandemic in 2020, whereby supermarket shelves are routinely raided world-wide as citizens worry about continuity of supplies. The *Cairns Local COVID-19 Rapid* Social Needs Assessment identified that "COVID-19 has affected the social fabric of the Cairns region with 96% of respondents in the project focus group identifying that people felt more insecure and uncertain now than before" (Babacan et al., 2020, p. 3), leading to an increased reliance on food aid intervention to meet everyday food needs. The same study found that during COVID-19 conditions, more people are seeking food relief across the Cairns region for the first time in their lives.

The Disaster Management Unit (DMU) of the Cairns Regional Council acknowledges that despite current advances made, ongoing near-misses from outright catastrophic events have served to reinforce disaster complacency or 'anaesthesia' within the broader community. This concern is supported by the Disaster Risk Management (DRM) sector more broadly across Australia (Howes et al., 2015).

Clearly this changing context requires increasing attention on our collective and nuanced vulnerabilities to rising food disadvantage (Reis, 2013; Foodbank, 2020b). 'Contingency planning' provides a pathway for doing so. It is about knowing what our alternative food access arrangements are – what we commonly refer to as our 'Plan B and Plan C' – when hardship kicks in. This planning improves the capability of everyone in to access food options when our regular food supply chain arrangements are under stress (Reis et al., 2020).

Cairns perspective

"There is limited planning within the organisation and generally within Cairns about food contingencies, this has resulted in a reliance on emergency food aid. Our organisation has a centre which distributes food on a weekly basis, and in times of crisis we have additional distribution although this is difficult to procure."

(Personal communications with an interviewee, from our research into the care of vulnerable citizens in the Cairns region, 2020).

Covid-19 perspective

"Early in the pandemic, when many Australians began panic buying and stockpiling, vulnerable Australians faced increased food insecurity as many of the basics disappeared from the shelves and they did not have the resources to stockpile or purchase more expensive alternatives."

(Australia's FoodBank Hunger Report, 2020, p. 16).

1.3 Cairns Regional Council

The Cairns Regional Council (CRC) area lies within the far northern Queensland area of the Wet Tropics (Department of Infrastructure and Planning, 2009; Queensland Government, 2020c), as shown in Map 2. It boasts world heritage significance including areas of rainforest and the extensive coastline that borders the World Heritage Listed Great Barrier Reef (Department of Infrastructure and Planning, 2009).

As a *United Nations Office for Disaster Risk Reduction (UNDRR) Role Model City*, Cairns participates in the 'Making Cities Sustainable and Resilient' programme under the UNDRR (Schofield and Twigg, 2019), and is demonstrating action in disaster risk reduction to promote resilient and sustainable development. Cairns was one of 20 pilot cities showcased for their planning progress toward ensuring growth and longevity in their disaster resilience-building activities. In terms of leadership, "Cairns benefits from having full-time focal points for disaster risk reduction. A local disaster co-ordinator and resilience officer support the coordination of core agencies, administrative departments and other key stakeholders" (Schofield and Twigg, 2019, p. 19-20). Furthermore, the authors acknowledge that existing "community awareness campaigns such as 'Be Ready Cairns' [have] encourage[d] community-level preparedness planning".

Consistent with Australia-wide trends, the Cairns region is subject to prolonged periods of hot, dry and heatwave conditions that effect farming productivity. This trend is punctuated by moderate to severe monsoonal events bringing cyclones, storm surge, soil erosion and flooding events that interrupt food supply routes such as road and rail. As part of the 'cyclone highway,' the Cairns region is particularly impacted by these events. For Northern Australia, there are supply chain deficits of concern, with Babacan et al. reporting that, "despite the longevity, scale and importance of agricultural industries in Australia, supply chains [in this region] are usually characterised by high transport cost along rural roads, seasonal constraints on usability, infrastructure distant from areas of production, and significant vulnerability to market- and weather-related shocks" (Higgins et al., cited in Babacan et al., 2020, p. 6).

Map 2: Cairns region, Australia

Source: Adapted from Google Maps, 2020.

2 Methodology

Our research team asked, *"How can vulnerable communities improve their resilience to future disasters through access to locally-produced food?"*. Within this pilot project, we are engaging with key stakeholders from the Cairns region as a case study example to explore key themes for building local food resilience and contingency plans.

The pilot study comprises two stages. In **Stage 1** (complete: March 2020 to March 2021), we demonstrated how local food resilience and contingency could be integrated within Council's *Disaster Resilience Strategy*.

In **Stage 2** (commencing April 2021) aims to establish an online 'Food Resilience and Contingency Hub' for supporting the broader food resiliencies and contingency plans for the Cairns region.

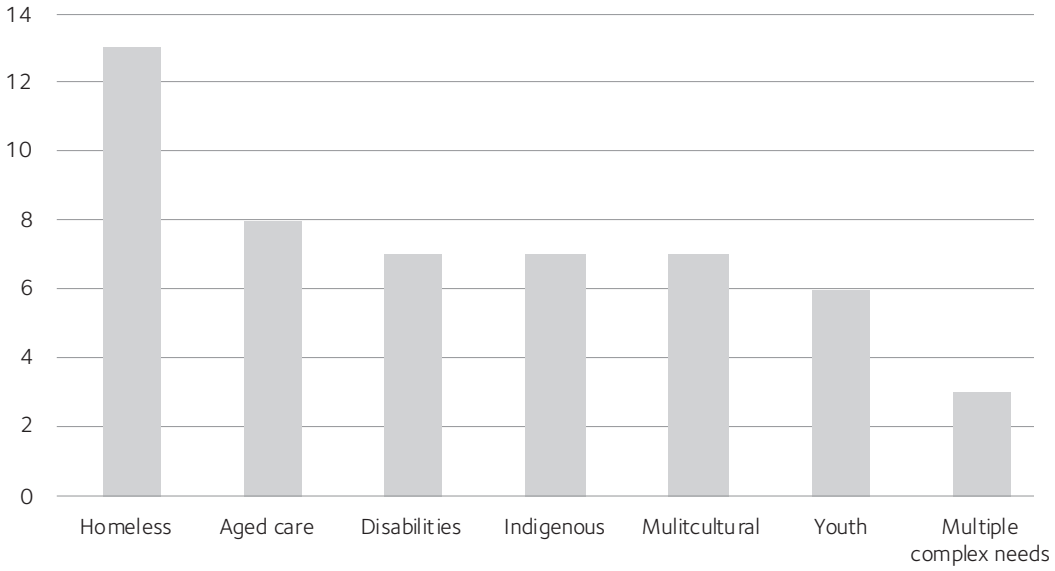
The Stage 1 research steps are summarised in Table 1 involving literature review, survey (online and by phone interview), two workshops with key stakeholders, and interviews with experts in the field of disaster management.

Table 1: Research steps

SUMMARY OF METHOD STEPS IN THE RESEARCH PROCESS
1. **Literature review:** Desktop review including document searches of peer-reviewed literatures, government policies and plans.
2. **Scoping workshop:** 2-hour online session via the Teams platform to determine the main research themes for investigation. This included members within the Cairns local Council working across disaster management; social, economic and environmental sustainability; and planning.
3. **Online survey:** Surveyed organisations serviced the care of people including homelessness, aging, disabilities, disengaged youth, multiculturalism and Indigenous identities. (See Graph 1). Data was collected by the undergraduate student researcher for this research project and Honours Thesis research with a total of 13 responses gained.
4. **Online telephone interviews using survey questions:** Data collection was undertaken via telephone interviews to boost the response rate. Upon revised ethical clearance, an additional 8 telephone interviews were conducted by Cities Research Institute, post-graduate Research Assistant. In total, 47 organisations were contacted with 21 responses across the combined online survey and telephone interviews.
5. **Data analysis:** A thematic analysis of the key findings from the primary data collection involved sorting the findings into key themes and comparing with opportunities and challenges identified in the literature.
6. **Key insights workshop:** 2-hour online session via the Teams platform to discuss the preliminary findings and determine key actions for integrating local food actions within the Council's *Disaster Resilience Strategy*. This included members within the Cairns local Council working across disaster management; social, economic and environmental sustainability.
7. **Undergraduate Honours Thesis submitted for review:** Primary supervision from Griffith University and co-supervision from the Cairns Regional Council Disaster Management Unit. See details of the thesis research below.
8. **Expert peer review:** Members within the Cairns Regional Council working across disaster management; social, economic and environmental sustainability were invited to provide feedback and suggestions on the key insights and actions to go into the final report.
9. **Final report:** A draft report was presented to Council for feedback and editing which informed the final report.

Graph 1 shows the vulnerable group types that the surveyed organisations work with.

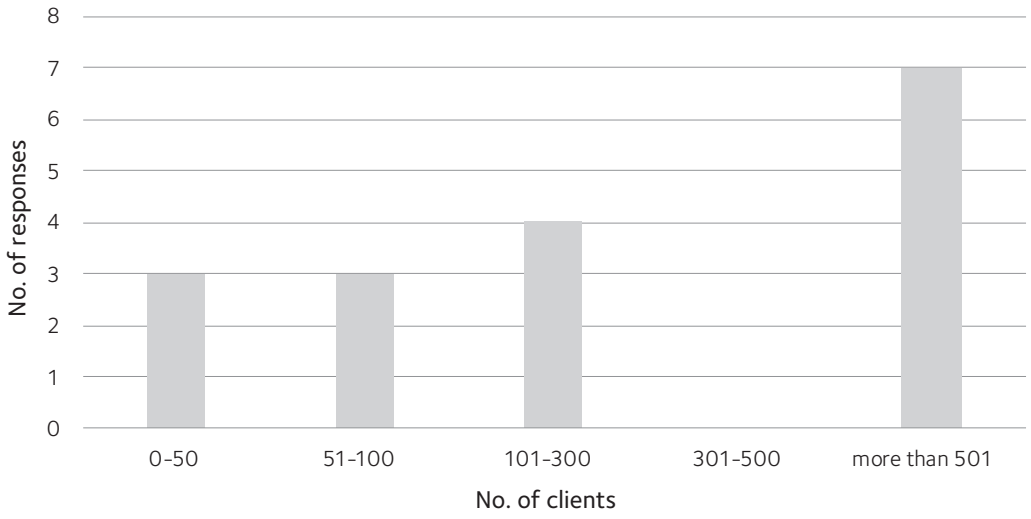
Graph 1: Organisations working with vulnerable group types



The majority of organisations in this study served 500 or more individual clients, with 83 per cent of the organisations reporting an increase in the number of people seeking their services, as shown in Graph 2, aligning with other findings from surveys during the COVID-19 outbreak.

A similar trend is reported in the Cairns Local COVID-19 Rapid Social Needs Assessment where service agencies identified new clients looking for their services for the first-time including food aid (Babacan et al., 2020).

Graph 2: Number of clients supported by organisations



For Stage 1, an ethical review protocol was undertaken and approved by the Griffith University Office for Research with the registration number issued: GU Ref No: 2020/580. This ethical review protocol also covered online survey research activities undertaken by an undergraduate Honours researcher (see summary box).

In the following sections, we use the findings of the literature review and workshops to inform the synthesised key considerations for turning towards local food resilience as a strategy for improving community wellbeing. Section 4 information about the socio-economic appreciation draws directly on the online and telephone-based survey conducted in the Cairns region with key stakeholders.

Honours Thesis Title: Food Contingency Planning for Vulnerable Communities within Disaster Management: An Assessment of the Cairns Region's vulnerable communities

By Prudence Liddy

Supervisors: Dr. Kimberley Reis (Griffith University) & Sioux Campbell (Cairns Regional Council)

This final year thesis explored how vulnerable community members could be supported through local government-led food contingency planning. The key theory of Social Learning Theory was consulted to understand the link between learning and cognitive psychology. Given the role Social Learning Theory could play in educating communities and organisations and increasing community resilience and adaptive capacity, it was used to address the Research Question: What shorter and locally-based food contingency arrangements can help to support existing food arrangements?

A literature review was conducted to outline key themes and concepts relating to disaster events, food security, local food contingency planning, and supporting vulnerable communities. From the literature gathered, many factors were identified that could impact food security, most significantly climate change, disaster events, and pandemics. Each of these factors threatens food supply chains, food access and availability, highlighting the need to plan local food access options when food supplies are impacted.

This research is important given the global impacts of disasters, specifically COVID-19 pandemic, and the impact these disasters have on food access, availability, import and export, and the resulting increased levels of vulnerability. From the thesis, readers can gain an understanding of food contingency arrangements and the importance of creating food planning within local governments, due to the global severity and impact of disaster events.

Given that disaster events can exacerbate vulnerabilities, planning food contingencies around the needs of vulnerable community members creates better food contingency planning.

Furthermore, food security and vulnerability were identified as intertwined aspects. The threat of food security increases the number of vulnerable people, and vulnerable community members are at a higher risk of food security. Therefore, there is a need to reduce food insecurity and create methods to support vulnerable community members.

The Cairns region was selected as the case study area due to the large range of disaster events and variety of vulnerable groups within the region. Specifically, Babinda, the Northern Beaches, and Central Cairns were explored to identify vulnerable groups and the threats these groups face. Organisations that support vulnerable community members were engaged to understand the wants and needs of vulnerable communities and supporting organisations. There was a distinct lack of awareness within the community about food access options and disaster event information. Furthermore, there was a clear reliance on food aid and farmer's markets. However, there was a significant want for more local food access options that would enable more community members to access food within disaster events and increase community resilience. There was also a desire for communication methods that engage all community members and their needs.

A series of recommendations were posed, based on the primary and secondary data collection, highlighting the need for well-planned local food contingencies tailored to community wants and needs. The most prominent recommendations included the need to develop a local food contingency plan within the Cairns disaster management framework, the need for awareness raising through an educational campaign, and the need to establish a sub-committee focusing on local food resilience, within the Cairns Local Disaster Management Group.

3 Key considerations for local food resilience and contingency planning

A review drawn from a range of evidence shows that enabling access to a variety of local and regional food options is necessary and practical, not only for addressing sustainability and resilience, but for building contingency plans that harness those capacities when times get tough, and in anticipation of those times (Reis et al, 2020). For example, the United Nations Food and Agriculture Organisation (FAO) advocates that smaller-scale food access options play an important role in local governments and their capacity to respond to COVID-19 and other food emergencies (FAO, 2020b). Having planned access to a range of smaller-scale food distribution options increases possibilities for a greater sense of agency and hope to deal with difficulties (Snyder, 2000).

From the survey and workshop discussions with various Cairns Regional Council stakeholders, it is clear that harnessing that sense of agency and hope to deal with difficulties will kick in more efficiently and effectively if the provisions and practices around local food relationships are normalised as a part of everyday living. In the following paragraphs we present five considerations for local food resilience and contingency planning towards normalising 'local food' in the community. This has been synthesised from the literature, survey and workshops, and through expert peer-review by key Cairns Regional Council stakeholders.

3.1 Acknowledge the increasing local experiences of food insecurity

It is important to consider Australia's domestic-related food security beyond meeting the benchmarks of exports and foreign aid. The Food and Agriculture Organisation of the United Nations (FAO, 2006) and the World Food Summit (2019) define that, "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". This definition is supported globally by the latest *World Food Summit* in 2019 (Ministry of Food, Agriculture and Fisheries of Denmark, 2019). Table 2 clarifies the globally accepted key dimensions of food security for managing each nation's internal domestic concerns.

Covid-19 perspective

"Demand for food relief in Queensland is rising and is higher than ever recorded in Foodbank Queensland's 25-year history... COVID-19 is having a profound effect on Queensland's hunger crisis, with one third (33%) of those facing hunger in 2020 having never experienced it before."

(FoodBank Hunger Report – FoodBank, 2020a, para 1).

Table 2: Globally accepted dimensions of food security

Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
Food access: Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic, and social arrangements of the community in which they live (including traditional rights such as access to common resources).
Utilisation: Utilisation of food through adequate diet, clean water, sanitqation, and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.
Stability: To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g., an economic or climatic crisis) or cyclical events (e.g., seasonal food insecurity). the concept of stability can therefore refer to both the availability and access dimensions of food security.

Source: FAO, 2006.

The experience of food insecurity within the households of high-income countries "is a serious public health concern" (Loostra 2018, p. 270). Although Australia is a wealthy nation, not all Australians experience food security at all times. Indeed, it can be a surprise that the system that creates the ability to export more food than it consumes can also perpetuate systemic and chronic food inequity for some (Biddle et al., 2020).

Groups of people who experience food insecurity at higher rates than the general population in Australia include: "indigenous people; unemployed people; single parent households; low-income earners; rental households; and young people" (Rosier, 2019, para 6). Additional people who are vulnerable to food insecurity include "some culturally and linguistically diverse (CALD) groups including refugees; people who do not have access to private and/or public transport; people who misuse alcohol and tobacco; and people who are disabled, unwell or frail" (Rosier, 2019, para 7). COVID-19 conditions have also exacerbated the incidence and severity of food disadvantage "rendering vulnerable people more vulnerable" (FAO, et al., 2020, p. 22).

In the Cairns region this has locally resulted in additional people seeking food aid for the first time (Babacan et al., 2020).

> The nutritional status of the most vulnerable population groups is likely to deteriorate further due to the health and socio-economic impacts of COVID-19.
>
> (United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 5).

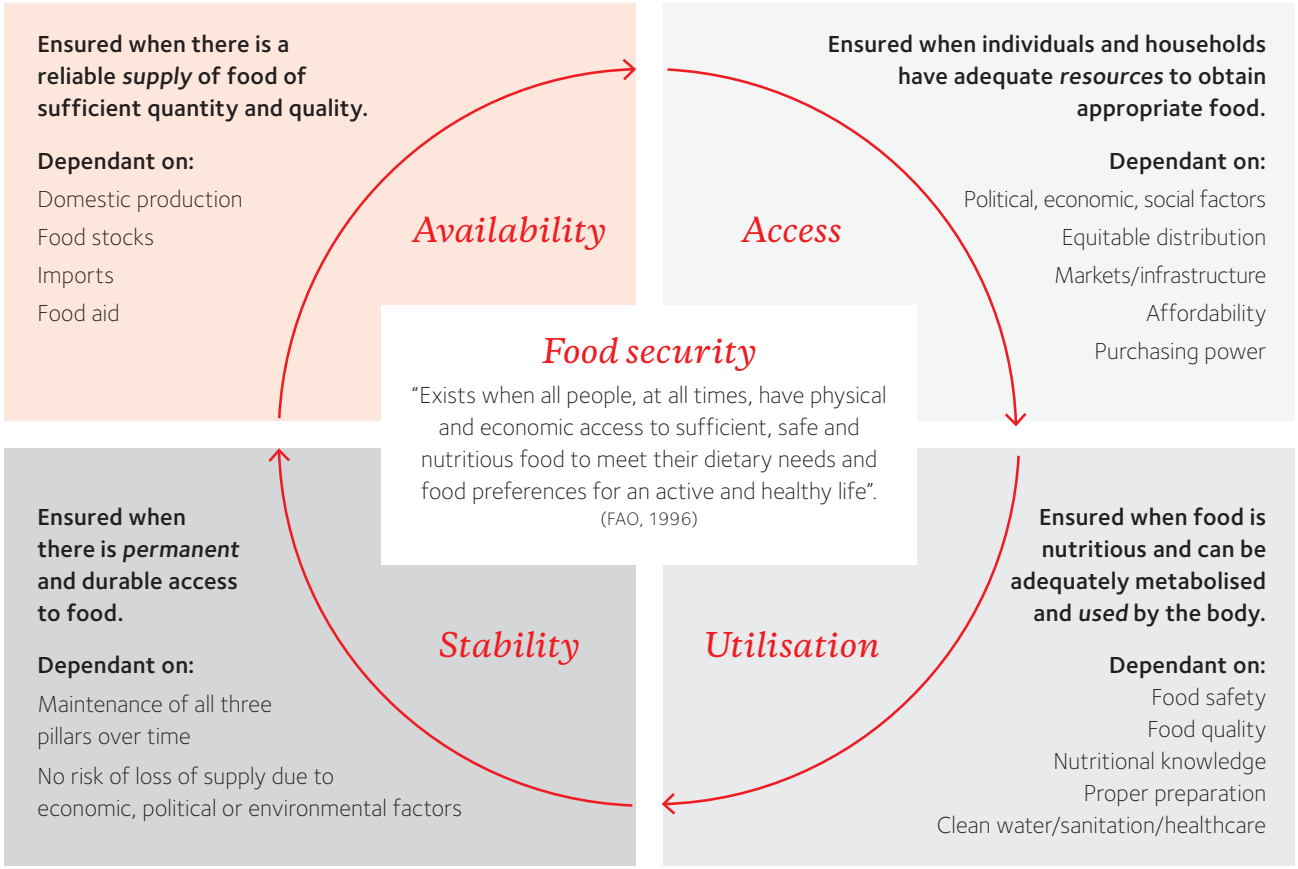
Image 1: Food relief box

Source: iStock. (Credit: ThitareeSarmkeasat).

In terms of food access, the most vulnerable people experience chronic, ongoing limitations in ability to purchase affordable food and access that food within their neighbourhood (See Figure 1 below). In terms of food utilisation, these people are more vulnerable to compromised safety levels of food handling and in terms of food availability.

The use of food aid is commonplace and charitable services are the main source of food. For vulnerable people, these experiences are normalised in a nation that is viewed in the mainstream as 'food secure'. These conditions are more congruent with the experience of 'food stress' (Landrigan et al., 2019).

Figure 1: Key features of food security



Source: Adhikari, 2018.

In the midst of pandemic conditions, we are seeing particular groups in Australia that experience food insecurity at higher rates than the general population, however, more Australians now share the common experiences of ongoing and chronic limitations in ability to purchase affordable food with food aid and food relief playing a more important role in their lives.

Table 3 highlights the experience of chronic and transitory food insecurity. For many Australians, emptying supermarket shelves reveals transitory conditions and the effects are largely felt with widespread anxiety about not having enough food or about having to rely on food aid or food relief.

These emerging conditions require a range of decision-makers from governments, business and communities to re-examine the assumptions about 'who' is vulnerable to food insecurities and how these vulnerabilities may be exacerbated and magnified in intensity and severity.

Within this context, our research asks: *"How can vulnerable communities improve their resilience to future disasters through access to locally-produced food?"* To address this question, we highlight several hemes about what food supply chains are and could mean for decision-makers addressing vulnerabilities within critical food-related infrastructure.

Table 3: Chronic and transitory types of food insecurity

	CHRONIC FOOD INSECURITY	TRANSITORY FOOD INSECURITY
is...	long-term or persistent.	short-term and temporary.
occurs when...	people are unable to meet their minimum food requirements over a sustained period of time.	there is a sudden drop in the ability to produce or access enough food to maintain a good nutritional status.
results from...	extended periods of poverty, lack of assets and inadequate access to productive or financial resources.	short-term shocks and fluctuations in food availability and food access, including year-to-year variations in domestic food production, food prices and household incomes.
can be overcome with...	typical long term development measures also used to address poverty, such as education or access to productive resources, such as credit. They may also need more direct access to food to enable them to raise their productive capacity.	transitory food insecurity is relatively unpredictable and can emerge suddenly. This makes planning and programming more difficult and requires different capacities and types of interventon, including early warning capacity and safety net programmes (see Box 1).

Source: FAO, 2008.

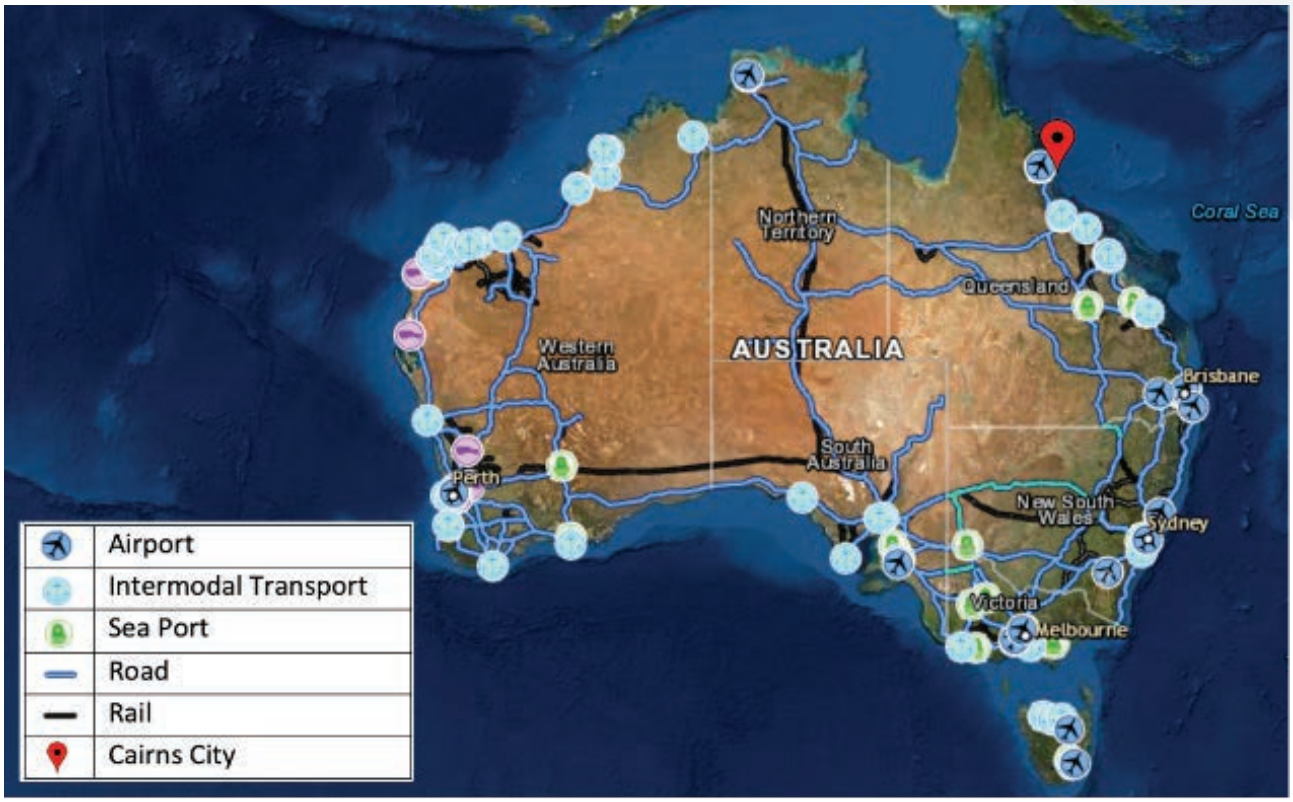
3.2 Recognise food supply chains as critical infrastructure

3.2.1 Long food supply chain characteristics

Transport of food products in Northern Australia is "characterised by long supply chains between production, processing and markets in Australia, with transport distances often upwards of 2,500 – 4,000 kilometres" (Higgins et al., 2015, p. 32).

Map 3 indicates the extensive distances that food travels along key freight routes across Australia (Department of Infrastructure, Transport, Regional Development and Communications, 2021).

Map 3: Australian national key freight routes



Source: Adapted from Department of Infrastructure, Transport, Regional Development and Communications, 2021.

> The food system underpinning the world's current food consumption patterns is responsible for 21–37 per cent of total anthropogenic greenhouse gas (GHG) emissions, meaning originating in human activity, which reveals it to be a major driver of climate change...
>
> (United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 29, on the hidden climate change costs of what we eat).

> Inadequate food storage, poor road infrastructure and limited food preservation capacity, especially for highly perishable foods, lead to food losses and inefficiencies along the food supply chain that drive up the cost of nutritious foods.
>
> (United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 34, on the factors driving the cost of nutritious food).

Australia's *Critical Infrastructure Resilience Strategy* identifies the food supply chain as critical infrastructure. As seen in Figure 2 below, it includes the physical and communication facilities, and the various actors and their networks (including industry associations, cooperatives, companies and corporations). Long food supply chains comprise, but are not limited to:

1. **Farming and post-harvesting practices:** These involve the various processes required for food production and its preparation to exit the production site. To simplify the model, it also includes the pre-production input providers upon which industrialised agriculture depends such as the developers and suppliers of agricultural inputs including seeds, fertilisers, pesticides and irrigation infrastructure. The Cairns region is highly reliant upon agricultural productivity of the southern Australian regions (Australian Government, 2015) as discussed in Section 3.3.2.
2. **Food processing, warehousing and distribution:** Processing involves centres for food handling, cleaning, manufacturing, packaging and regulators of safety and quality control. Warehouses for storage depots for the manufactured goods. These wholesalers are central points for further food distribution and sale for export or to a range of domestic retail outlets for food such as supermarkets. For food distribution, a variety of transport modes and logistics are routinely used such as road, rail, sea and air freight. To simplify the model transportation of food actually occurs along the entire chain not just between individual steps.
3. **Food retail and consumers:** Food retail includes outlets such as supermarkets, markets, corner stores and restaurants. Consumers are then the patrons who purchase food from food outlet locations.

Figure 2: A long food supply chain model

Source: Adapted from Zag.fresh, 2020.

This model of a long food supply chain presents a greatly simplified view that does not reveal the true complexity of the industrialised and digital system, which is expanded upon in Figure 3. For example, the globalisation of the food supply chains makes it possible for ingredients in pizza sauce to come from remote parts of the world (Metcalfe 2019), adding to concerns about the traceability and transparency of food safety practices (Bazzani & Canavari, 2013; Blay-Palmer, 2008) and associated impacts on environmental and public health (O'Kane 2021; FAO 2018).

A key concern relates to the extensive contributions of food transport to global carbon emissions (Bask & Rajahonka, 2017; Vermeulen et al., 2012; FAO, 2018). Food systems – including agriculture, manufacturing, refrigeration, transport, retail, consumption and waste disposal – also comprise an estimated 21-37% of the world's total annual C02eq emissions for the 2007-2016 decade (Rosenzweig et al., 2020; FAO, 2020a).

Food supply chain actors and their networks are identified as 'critical infrastructure' as the disruption of food along these connecting links in the chain may impact our social and economic wellbeing (Commonwealth of Australia, 2015). COVID-19 has shown that with world-wide raiding of supermarket shelves, long food supply chains can resupply shelves with the "just-in-time" food supply model (Hendriskson, 2020, p. 579; Weersink et al., 2021, p. 2).

However, in light of increasing climate impacts and ongoing waves of pandemic conditions, the sustainability of this model is questioned (Clapp and Moseley, 2020). For example, the global food system has a complex architecture with may potential bottlenecks that may yet still be revealed as the ongoing impacts of COVID-19 continue to evolve (Cullen, 2020; Espitia et al., 2020; Economist Editorial Board, 2020).

Figure 3: Complexity of long food supply chains

Source: Medici Global Inc, 2018 (above) and Anderson, 2016 (below).

3.2.2 Shorter food supply chain characteristics

With the onset of COVID-19, Australian food researchers advocate for governments to enable "scale appropriate action" that permits food-related "decisions to be made as close to the community level as possible" (Blay-Palmer et al., 2020, p. 518). Shorter Food Supply Chains (SFSCs) enable locally- and regionally- based coordination for accessing food that could be geographically accessed within a 400-kilometre radius, however distances can vary (Martinez et al., 2010).

SFSCs come in a variety of forms including, but not limited to: farm gate sales and shops; farmer and artisan markets; Pick-Your-Own produce on farm sites; Community Supported Agriculture and Box Schemes; direct sales from cooperatives, consortiums and collectives; local retailers and restaurants; supermarkets with local procurement practices; community, school and home gardens; purchasing groups; online and home deliveries; and local and regional food hubs.

Figure 4: Characteristics of short food supply chains

Short food supply chains (SFSCs) can act as a driver of change and a method to increase sustaiblity, trust, equality and growth in agricultural, food, business, social, health and rural policy areas.

"Short" can only be fully defined within each particular policy context.

SFSCs are very varied in nature and practice and exist all over the world in a wide variety of forms, in both commercial and non-commercial settings.

Short food supply chains (SFSCs) are an alternative to long globalised food chains and play an increasingly important role in food supply networks.

Characteristics of short food supply chains

- "Short" refers to both **physical and social distance**.
- Social distance refers to the opportunity for the producer and the consumer (where they are not the same person) to **interact** and share information. There are no or **very few intermediaries** in SFSCs.
- **Information** exchanged includes details about the origin, production method and sustainability of the product, but also about the indentity, values and ethics of both the producer and consumer.
- Physical distance covers the **distance a product has travelled** between points of production and sale. Its limitation varies and depends on each particular policy content and situation as well as consumer expectation.
- There is **openness** by the supplier about both the social and physical distance of the product.

Foodlinks

Short food supply chains can increase food supply resilience

- They complement longer food chains and diversify food supply networks.
- They are based on a wider range of producers.
- Traceability can be more easily checked.
- They are generally more flexible and adaptable to new situations and consumer needs.

Source: Adapted from Galli and Brunori, 2013, p. 9, 10.

Table 4: SFSCs and sustainability goals

GOOD GOVERNANCE	ENVIRONMENT INTEGRITY	ECONOMIC RESILIENCE	SOCIAL WELLBEING
• Corporate ethics • Accountability • Participation	• Atmostphere • Water • Land • Biodiversity • Material and energy • Animal welfare	• Vulnerability • Product quality and information • Local economy	• Decent Livelihood • Fair traiding practices • Labour rights • Equity • Human safety and health • Cultural diveristy

Source: Paciarotti and Torregiani, 2021, p. 430.

Food systems invite holistic and integrated ways of thinking (Kebede et al., 2021). This is a form of "nexus thinking" which means exploring the relationships between "water, food, energy and ecosystem behaviour simultaneously" rather than viewing them individually (Malagó et al., 2021, p. 1). The multi-contextual dynamics around local food systems therefore hold multiple avenues for building a variety of capacities for sustainability (Galli & Brunori, 2013; Cvijanovićet al., 2020). By sustainability, we intend that SFSCs aim for "meeting the needs of the present without compromising the ability of future generations to meet their own needs" as defined by the Brundtland Commission in 1987 (World Commission on Environment and Development, 1987). Paciarotti and Torregiani's (2021) review of the literature presents summarising contributions of SFSC to sustainability goals as summarised in Table 4 above.

> The COVID-19 pandemic is a timely reminder of how hazards within the complex and changing global risk landscape can affect lives, livelihoods and health. It provides a compelling case for an all-hazards approach to achieve risk reduction as a basis for sustainable development.
>
> (Australia's Royal Commission into National Natural Disaster Arrangements Report 2020, p. 68).

In tandem with sustainability research of SFSCs, the past decade has seen much research turned to the theme of 'resilience' including the need to withstand and recover from climate-related shocks to the globalised food system (Lim-Camachoa et al., 2017). This includes the opportunities that SFSCs present under the complex circumstances of severe weather events (Smith et al., 2020), and in particular, the roles that urban food producing sites (Cristiano, 2012; Ilivea, 2017; Thornton, 2020) and local purchasing programs (Bougherara et al., 2009) play to ameliorate these impacts.

The goals of sustainability and resilience have much in common as they have long-term horizons, are based upon meeting needs and apply a range of adaptive innovations to anticipate, respond to, recover from disruptive events (Marchese et al., 2019).

The term, resilience has developed beyond its forerunning links with encouraging ecological resilience for sustainable outcomes (Berkes et al., 2000), to include building capacity and capability within a variety of communities for disaster resilience generally, and the importance of accessing local food options to encourage capacities for resilience and contingency planning (Reis, 2013).

3.3 Identify food supply chain vulnerabilities

The Cairns Wet Tropics area can expect increased temperatures between 1 and 2.2 degrees Celsius by 2050 (Queensland Government, 2010). Rainfall patterns are expected to change (Queensland Government, 2010), with rainfall reducing in the study area of Far North Queensland (FNQ). More frequency of hot days and warmer nights, less colder days, and seas are expected to rise at estimates of 0.26 to 0.79 meters (Queensland Government, 2010).

Climate change will affect the Wet Tropics area with impacts to terrestrial biodiversity (Queensland Government 2010, 2009) and marine biodiversity including the Great Barrier Reef ecosystems and structural corals (Cheal et al., 2017; Fordyce et al., 2019; McKenna et al., 2015). With impacts on marine species distribution, the flow on effects then impact tourism, fisheries, and related industries (State of Queensland, 2019). Climate change poses ongoing challenges for farmers to adapt to the changing weather conditions and mitigate their emissions (Rosenzweig & Tubiello, 2007), and apply much-needed new farming techniques and technologies (Mushtaq et al., 2013).

> Climate change has already increased the frequency and intensity of extreme weather and climate systems that influence natural hazards.
>
> (Australia's Royal Commission into National Natural Disaster Arrangements Report 2020, p. 55).

In turning towards a local food resilience agenda, the first critical step is to understand food supply chain vulnerabilities for a given local jurisdiction. This must also be understood within the expectations of disaster management and emergency response.

In the case of Queensland, it is recommended that individuals (who are able-bodied and with no incapacitation) should anticipate their essential food supplies and plan for seven (7) days before Government intervenes with emergency resupply options. Where regional townships are known to experience more prolonged periods of isolation, the recommendation can extend to 8 to 12 weeks. For the anticipated period of isolation, prudent actions include stockpiling non-perishable food items, arranging extended lines of credit with local suppliers and maintaining sufficient fuel stock to operate generators to avoid food spoilage (Queensland Fire and Emergency Service, 2018).

With this context in mind, in the following sub-sections we explore a number of prompts for identifying food supply chain vulnerabilities, drawing from the following list created by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau of Meterology (BOM, 2020) in the Royal Commission into National Natural Disaster Arrangements Report (Commonwealth of Australia, 2020b). The trends include: Extreme rainfall events with an increase in intensity and flooding risk; storm surge impacts with coastal erosion affecting low-lying communities and infrastructure; cyclonic impacts in coastal areas due to rising sea levels and increases in extreme rain and wind; intense heatwave events with greater frequency and duration; and more intense and frequent fire events. In this report, we now consider key impacts of:

- Prolonged droughts upon agricultural activity and food supply.
- Cyclones, storm surge, flooding upon food distribution.
- The COVID-19 pandemic leading to widespread, anxiety-driven behaviour from food consumers.

3.3.1 A drying continent: Temperature, heatwaves and bushfires

The year of 2019 was Australia's warmest on record. The seven years from 2013 to 2019 are rated in as the warmest years. This trend indicates that most years are now "warmer than almost any observed during the 20th century" (CSIRO & BOM, 2020, p. 4). Please view the Interactive Map.

Interactive map

Access the Bureau of Meteorology interactive map on the last 111 years of Australian temperatures. These maps show the anomaly of mean temperature for each calendar year, compared to the average.

bom.gov.au/climate/history/temperature

Heatwaves are large contributors to the national mortality rate, particularly of people over 65 years of age (Queensland Government, 2020b). Heatwaves are described as "silent killers ... causing more deaths since the 1890s than bushfires, cyclones, earthquakes, floods and severe storms combined" (Queensland Government, 2020b, para 1).

Temperature increases are expected to bring more intense and more frequent heatwaves across Queensland (Queensland Government, 2020b), increasing the threat to humans, habitats, and animals alike (Fordyce et al., 2019; Ross et al., 2020; Kim & Stephen, 2018).

Australian perspective on food impacts

Changes in temperature, rainfall and humidity create risks to our health more indirectly. For example, the climate affects agricultural production systems and therefore the affordability and availability of foods, especially fresh fruit and vegetables, which are an important part of a healthy diet.

(Australia's National Climate Resilience and Adaptation Strategy 2015, p. 59).

Global perspective on food impacts

Climate change is expected to further aggravate seasonality through increased drought frequency, disruption of food production by floods and tropical storms, increasing and more variable temperatures and more erratic rainfall. This will lead to a general decline in agricultural production over the next two to three decades, turning into a major cost driver for food in the near future.

(United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 35.

By June 2019, the bushfire season started early in northern Australia with warnings of higher bushfire risk across Queensland (Withey, 2019). In the Summer of 2019-20, heatwaves drove temperatures in the Cairns region to 42.6 degrees, five degrees hotter than the previous November record. During that time – 12 days – 1200 fires broke across Queensland. It was the first time the catastrophic fire rating was used in the State of Queensland since the rating was first created in 2009 (Bradley, 2019). The CSIRO and BOM (2020, p. 5) confirm that "the frequency of the most dangerous 10 per cent of fire weather days has increased significantly in recent decades across many regions of Australia". The events interrupted the provision of essential services including the transportation of fresh food to supermarket shelves and the ability to access funds from bank accounts to pay for food (Commonwealth of Australia, 2020b).

Image 2: Convergence of bushfires, Northern New South Wales, 2019

Source: Brennan, 2019 (Credit: New South Wales RFS Northern Rivers).

3.3.2 Agriculture and drought

The Climate Council of Australia (2018, p. 2, 4) outlines that Australia has experienced several major droughts during the 20th and early 21st centuries.

The most severe and prolonged droughts include:

- The Federation Drought (1895–1903)
- The World War II drought (1939–1945)
- The Millennium Drought (1996–2010)
- With seven years from 2013 to 2019 rated in as Australia's warmest years on record, more than 87 per cent of Queensland was drought-declared by March 2017.

Image 3: Queensland drought

Source: International Water Association, 2016.

Australia's *National Climate Resilience and Adaptation Strategy* (Australian Government, 2015, p. 40) identifies the following risks to Australian agriculture in a changing climate including:

- "the increased frequency of drought conditions in southern Australia has the potential to affect agricultural yields, which can contribute to increases in food prices
- increasing temperatures and more frequent extreme heat events are likely to place livestock at greater risk of heat stress, reducing livestock productivity and reproductive rates
- rising water temperatures, changing currents and acidification of the ocean are likely to affect Australia's fishing industry
- forestry is facing an increased risk of declining productivity and tree mortality as a result of reduced rainfall, increased temperatures, natural disasters and water loss
- crops and horticulture are facing changes in growing seasons and changed frequency and intensity of heatwaves and storms
- changing temperature and rainfall patterns can affect the biosecurity risk posed by pests, diseases and weeds".

Interactive map

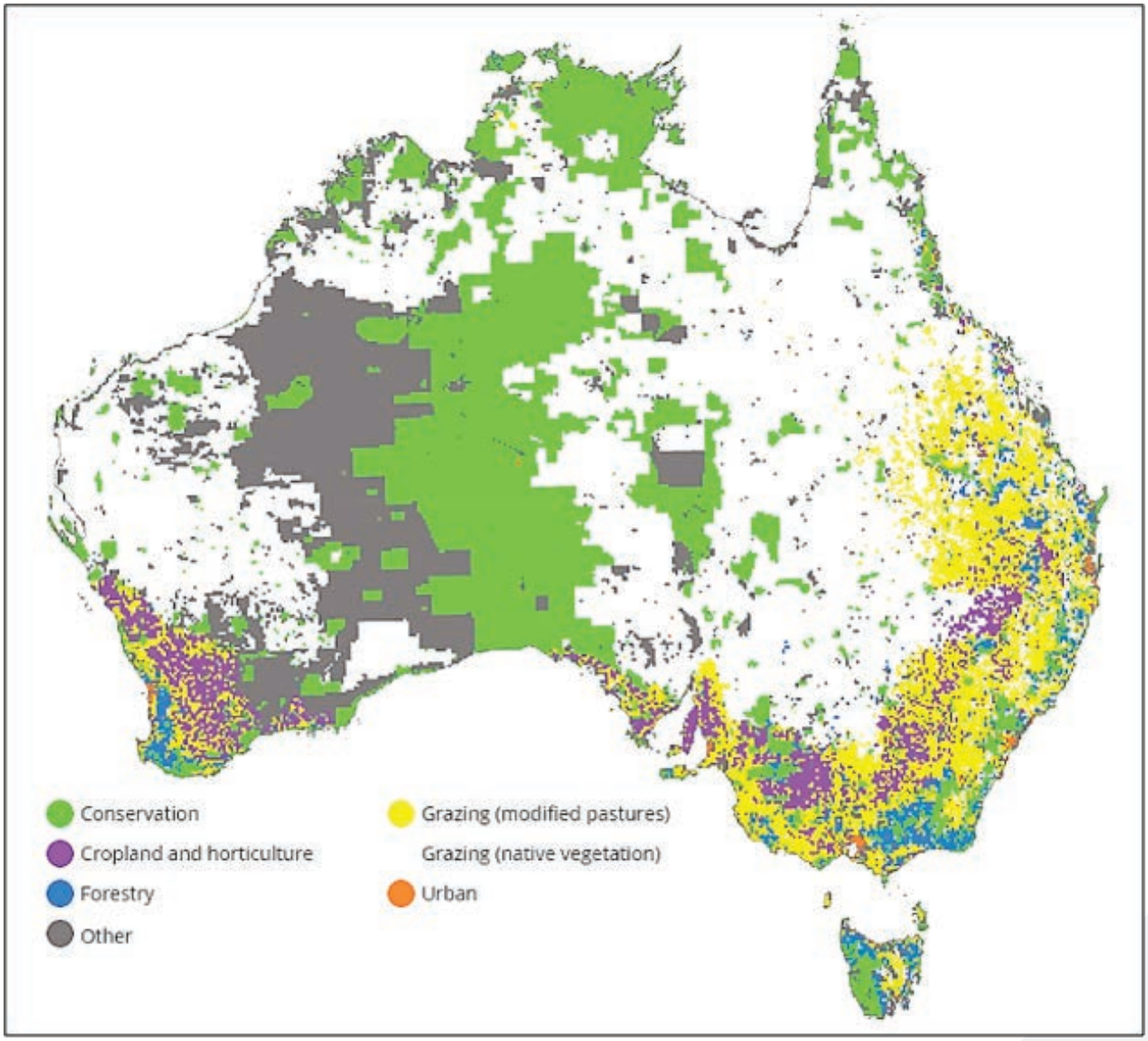
Access the Bureau of Meteorology interactive map on the last 121 years of Australian rainfall. These maps show the decile rank of rainfall for each calendar year.

bom.gov.au/climate/history/rainfall/

Map 4 below illustrates agricultural activity in Australia including cropland, horticulture and grazing. The southern areas of the nation including the south-eastern end of Queensland are the most agriculturally productive areas for these land uses. The Cairns regions relies upon the agricultural productivity of southern areas, however, "over the coming decades, time in drought is projected to increase across southern Australia, with a greater frequency of severe droughts. If this were to eventuate, it would present a major challenge for Australian farmers" (Australian Government, 2015, p. 43).

Farmers, farm managers and workers are severely affected by drought as they experience the loss of financial income (Edwards et al., 2009), and the associated mental health implications (Berry et al., 2008). The Australian Bureau of Statistics (2020) identifies that the impacts of drought are evident in agricultural activity across 2018-19 with many farming areas across the nation experiencing drought with New South Wales and Queensland particularly impacted.

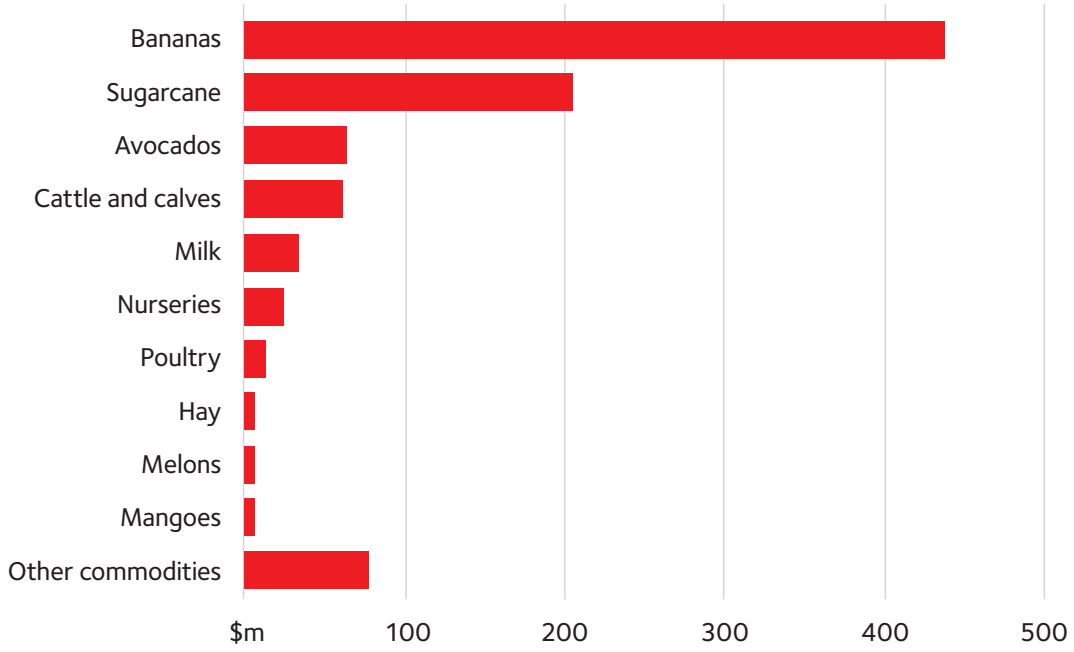
Map 4: Australian land uses



Source: Commonwealth of Australia, 2020b.

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (2020) identifies that the Cairns region has a diverse agricultural sector with bananas, sugarcane and avocadoes the most important crops. (See Graph 3 below).

Graph 3: Value of agricultural production, Cairns Region, 2018-19



Note: The graph shows only data published by the ABS. Some values were not published by the ABS to ensure confidentiality. The "Other commodities" category includes the total value of commodities not published as well as those with small values.

Source: Australian Bureau of Statistics, cat. no. 7503.0, Value of agricultural commodities produced, Australia 2020

Source: ABARES, 2020.

These crops have a combined value of 76% of the total value of agricultural production in the Cairns region. Bananas accounted for 93% of Queensland's crop production. In 2017-18, the Cairns region contained 8% of farm business in Queensland. Ash et al., (2017) assert that the potential irrigated agricultural development in northern areas of Australia may serve a niche market.

Babacan et al. caution that, "supply chains and associated transport logistics and infrastructure such as road and ports, processing facilities and power are all significant challenges for establishing a larger-scale agricultural sector in northern Australia" (Watson cited in Babacan et al., 2020, p. 7).

> Farmers and local communities across rural and regional Australia are on the frontline for many disasters.
>
> (Australia's Royal Commission into National Natural Disaster Arrangements Report 2020, p. 368).

3.3.3 Cyclones, storm surge, flooding and food distribution

Tropical cyclones in the Cairns region usually occur between November and April when heavy rain and high winds potentially cause extensive damage to property and infrastructure and posing a threat to life (CRC, 2020c). Cyclones have impacted the Cairns region numerous times, with 53 cyclones passing within 100km of the Cairns CBD since 1858 (CRC, 2020c).

Seven cyclonic storms, including two severe category four storms, have crossed the Cairns coast since 2000. Cyclone Larry in 2005 (Category 4), Cyclone Yasi (Category 5) crossing land in 2011 and Cyclone Ita in 2014 (Category 4) (CRC, 2020a).

Image 4: Flooded bridge at Russet Park on the Atherton Tableland in Tropical North Queensland

Source: iStock. (Credit: Wendy Townrow).

East coast lows not categorised as cyclones pose a continued threat to the Cairns region's communities (Callahan, 2003). The threat extends from the northern beaches and Cairns CBD to the coastal regions of the southern Council area (CRC, 2020f). Storm surge events are expected to increase in frequency and severity as cyclone and other storm event patterns increase in intensity and duration (Callahan, 2003). Cyclones may also have significant impacts on the reef (Cheal et al., 2017) and the tourism industry on which it depends (State of Queensland, 2019).

La Niña weather patterns exacerbate cyclone severity and occurrence (Callahan, 2003), and late 2020, moving into 2021, such weather trends have been declared (Australian Government, 2020a). Tropical cyclones typically impact the Cairns region's banana and sugar crops impacting prices (SBS News, 2013). Other impacted crops include 'exotics' such as lychee, rambutan, durian, mangosteen, jackfruit, macadamia, mango and avocado. Some animal farming also includes beef, dairy, pigs and aquaculture (Rural Industries Research and Development Corporation, nd).

Images 5 and 6: Bananas in a plantation destroyed by severe tropical cyclone Yasi

Sources: iStock. (Credit: Jaykayl).

A 2010-11 monsoonal event preceded Cyclone Yasi with much of Queensland inundated. The Queensland floods of 2010-11 are "estimated to have cost in excess of $5 billion... and affected more than 78 per cent of Queensland" (Australian Government, 2015, p. 63).

The extensive flooding impacted the Bruce Highway which is the main arterial road along the east coast of Queensland for transporting food.

Due to its volume of freight and passenger traffic it is of social and economic importance and therefore strategic significance. Queensland contains "over 33 000 kilometres of state-controlled roads. Over 9000 kilometres (or about 27 per cent) of the network were affected by the natural disasters of the 2010/2011 wet season" including impacts on the Bruce Highway (State of Queensland, 2012, p. 252). Furthermore, the floods "affected over 3000 kilometres of Queensland Rail track across the state in some way" (State of Queensland, 2012, p. 225).

> [An] important component of market infrastructure is the overall quality and efficiency of the national road and transportation network, which is critical in getting produce from the farm gate to markets at reasonable cost.
>
> (United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 36).

Image 7: Flood sign, Queensland

Source: iStock. (Credit: Lakeview_Images).

3.3.4 COVID-19 pandemic, anxiety and food insecurity

Supermarkets and transport logistics are becoming better prepared in anticipation of oncoming severe weather events (Fernbach, 2020).

With the experience of COVID-19 and the benefit of hindsight, supermarkets are motivated to improve the shopping experience of customers and reduce their sense of anxiety for accessing supplies to meet their basic needs (Mechelse & McQuilkin, 2020). However, the experience of anxiety about accessing food is a feature of food insecurity (Rosier, 2011). (See Images below).

Image 8: Supermarket queue in Australia during COVID-19

Source: Fuller, 2020.

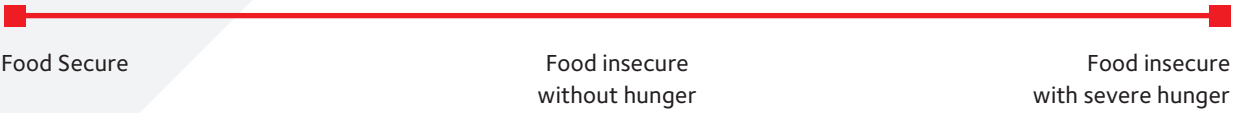
Images 9 and 10: Empty Australian supermarket shelves

Sources: iStock (Credit: DLMcK (left) and ArtMarie (right)).

Food security occurs across a continuum as outlined in Figure 5 below. At one end of the continuum, when people are 'food secure' they have unimpeded and ample access to nutritious food; they know how to utilise that food; and that food is affordable and available to them.

At the other end of the continuum, when people are 'food insecure with severe hunger' meals are often missed or inadequate (Rosier, 2011).

Figure 5: The food security continuum



Source: Rosier, 2011.

With varying degrees between these two ends of the continuum, those who may become 'food insecure without hunger' typically experience anxiety accompanied by uncertainty about accessing their basic food needs. This experience of food insecurity was reported globally during the various waves of COVID-19 throughout 2020-21. The experience of anxiety is illustrated with restricted access to supermarkets; long supermarket queues and 'raiding' of supermarket shelves and 'hoarding' food.

Media reports reduce these experiences and associated behaviours as irrational and excessive. However, due to the COVID-19 pandemic we have come to increasingly understand the crippling effect that anxiety itself, exerts on the supply chain (Reis et al., 2020; Shakespeare-Finch et al., 2020).

FoodBank (2020b, p. 20) reports that the "most common emotions experienced as a result of not having enough food include stress (49%), depression (46%), anxiety (41%) and sadness (39%)". These emotions experienced about relying on food aid are prevalent amongst those experiencing food insecurity for the first time due to COVID-19. FoodBank (2020b) advises that people are not seeking the help they need revealing significant barriers to reaching out for assistance (See Figure 6).

Figure 6: Three top barriers to seeking food relief

Source: FoodBank, 2020a.

Image 11: FoodBank organising COVID-19 food relief supplies

Source: FoodBank, 2020b.

> We started to see another layer on top of our regular clients, of people who hadn't accessed food relief before and were doing okay before the pandemic. Some had two working people in their families and then they no longer had jobs... because they were thrown into that situation, the levels of anxiety and fear rose, people were very worried... people live to their income. You rent places you can afford on your income so when you have no income, the first thing that goes is food.
>
> (Quote from a charity in Australia's FoodBank Hunger Report 2020, p. 12).

3.3.5 Recent Australian Bushfires – 2019-2020

The *Royal Commission into National Natural Disaster Arrangements Report* (Commonwealth of Australia, 2020b, p. 227) identified that bushfires can have similar impacts on food supply interruptions as flood conditions, whereby "During the 2019-2020 bushfires, some firefighting assets could not be transported between communities due to fires and road closures, which had a direct impact on the emergency response. Road closures also impeded the ability for communities to evacuate during the bushfires and disrupted the transportation of essential goods, such as food, across the country – impacting relief and recovery efforts".

Australia's *Royal Commission* reminds us that bushfires, or any other disaster events impact our capacity to access food due to road closures, loss of homes and livelihood, destruction of powerlines and power outages that prevent access to one's own cash in order to purchase food (Commonwealth of Australia, 2020b).

Shared experience from the bushfires

Once the shops opened, they were cash only, as there were no communications and for some, no power. A lot of people did not have cash. We fortunately had a little, and were able to lend some to our neighbours. We met people who were begging or trying to do small jobs for cash, just so they could buy food ... No banks were open, nor were any ATM operational so getting cash though this route was not possible.

(Australia's Royal Commission into National Natural Disaster Arrangements Report 2020, p. 228).

Image 12: Loss of power infrastructure from the Australian bushfires, 2019-2020

Source: Lannin, 2020.

3.4 Accommodate the potential for compounding events

The CSIRO and BOM (2020, p. 8) advise that the prolonged dry, extreme heat, low rainfall and subsequent fires of 2019-20 "provides a good example of compounding extreme weather and climate conditions and illustrates the effect of background climate trends amplifying natural climate variability".

Compounded disasters occurring at the time with the societal stressors evident in pandemic conditions, amplifies the complexity of impacts and hence the magnitude of challenges for the emergency management sector. "Consideration of the coincidence of other societal stressors at the time of compound disasters has not received attention before the current COVID-19 pandemic" (Risk Frontiers, Macquarie University and the Bushfire and Natural Hazards Cooperative Research Centre cited in Commonwealth of Australia, 2020b, p. 68).

The *Royal Commission into National Natural Disaster Arrangements Report* (Commonwealth of Australia, 2020b, p. 55) cautions that climate-driven natural hazards are expected to become more frequent and intense with more concurrent and consecutive hazard events. The years of 2019-20 raised the challenges of "drought, heatwaves and bushfires, followed by severe storms, flooding and a pandemic". Furthermore, these compounding events increase pressures on communities with each event adding to the scale of the impact generated by a previous event (Commonwealth of Australia, 2020b, p. 55).

Australia's current economic recession starkly demonstrates the ongoing challenge of balancing the social restrictions necessary for pandemic management with the need to generate employment and business activity (Janda & Lasker, 2020).

Image 13: Businesses close due to COVID-19 pandemic

Source: iStock. (Credit: tumsasedgars).

> Australia wide, there was significant community loss, devastation of wildlife and adverse health impacts. These losses were exacerbated by severe hailstorms, and floods in some areas that were just starting to recover from the fires. Then COVID-19 hit.
>
> (Australia's Royal Commission into National Natural Disaster Arrangements Report 2020, p. 5).

3.5 Embed local food procurement within sustainability and resilience agendas

While the impacts of COVID-19 are experienced around the world, a resilient and sustainable food system is more likely to be supported with a 'buy local approach' first, including its own variety of informal food procurement relationships, followed by a regional approach and then global approach to food supply lines (Blay-Palmer et al., 2020). Precedents in local procurement to support local business currently exist, for example, Business Queensland's *Go Local, Grow Local* initiative (Queensland Government, 2021).

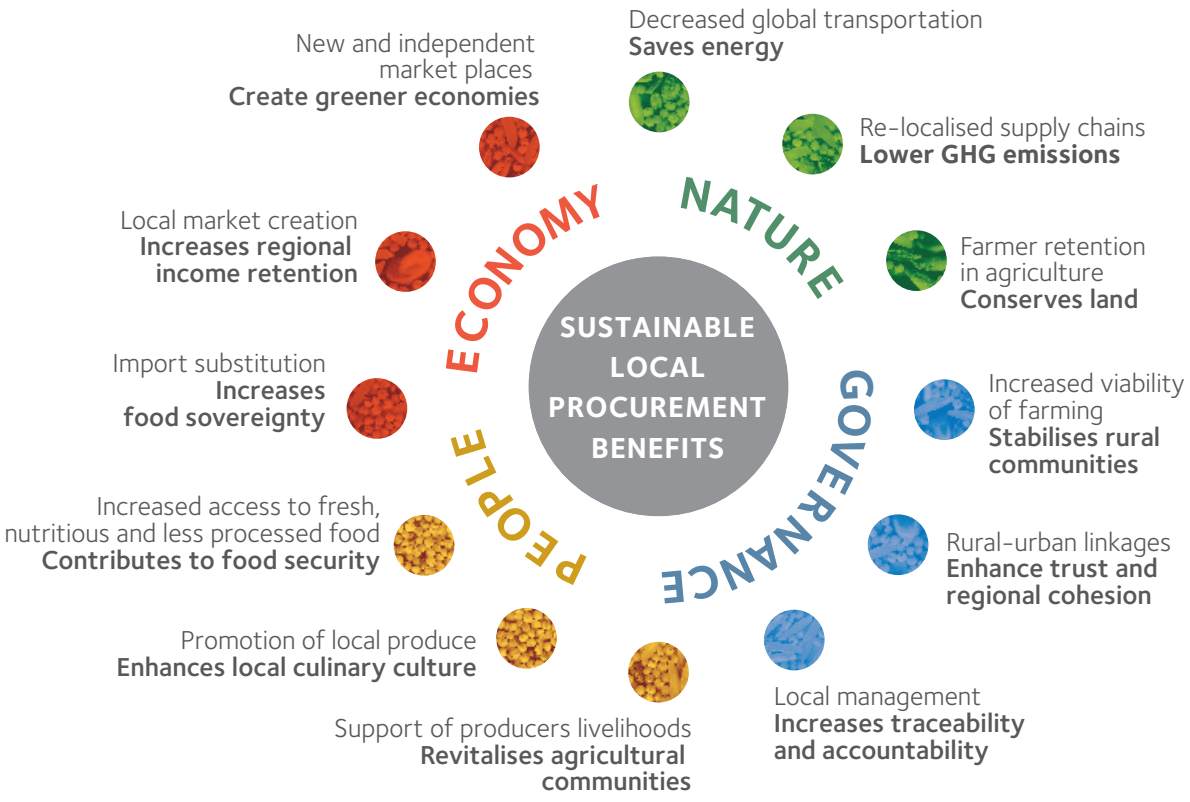
More specifically, we can view the lessons learnt with local food procurement initiatives in regional Victoria (VicHealth, 2010), and within international settings (FAO, 2014).

There are multiple benefits of increasing the priority of purchasing a percentage of food produced and food value-added within the immediate locality and region, as outlined in the Northern American experience (PolicyLink, 2015). For a snapshot of how local food supports holistic and sustainable benefits, view Figure 7 below.

In the spirit of this intent, the United Nations *City-Region Food System* approach provides examples to build upon for developing intra-urban (International Panel of Experts on Sustainable Food Systems, 2017b) and urban-rural food initiatives (FAO, 2021). The Local Governments for Sustainability (ICLEI) global *CITYFOOD Network* aims to support the transition from global aspirations to tangible local food actions instigated by local and regional governments (ICLEI, 2021).

Local food is a vital connector for the five strategic pathways of the *ICLEI Montréal Commitment and Strategic Vision 2018-2024* for sustainable and resilient development, including: 1) lowering emissions; 2) applying nature-based solutions; 3) closing the loop on waste for a circular economy; 4) placing resilience at the core of strategies; and 5) weaving people-centred development and equity into the social fabric (ICLEI, 2018).

Figure 7: Local food procurement benefits



Source: FAO, 2014.

Local food solutions for addressing these global issues sits at the centre of the *Milan Urban Food Policy Pact* (Milan Urban Food Policy Pact Secretariat 2021), an international agreement among cities across the world committed to:

> *"develop sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, that minimise waste and conserve biodiversity while adapting to and mitigating impacts of climate change".*

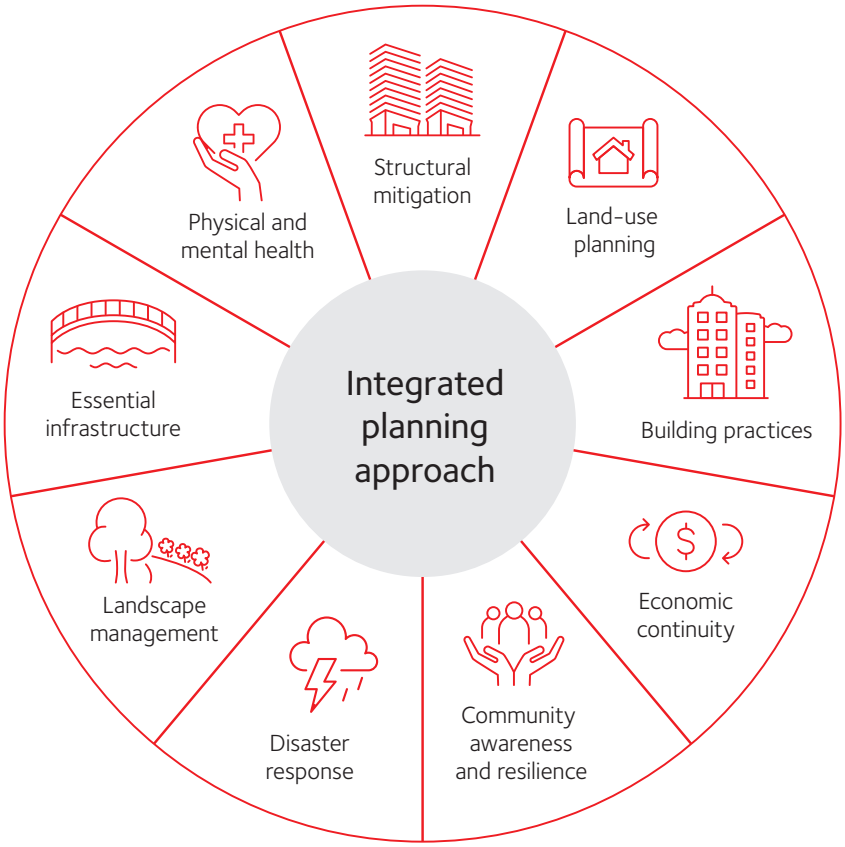
The Queensland Government's *Regional Resilience Strategies* (Queensland Reconstruction Authority [QRA], 2021) aim to demonstrate and mainstream integrated approaches to make resilience a part of business-as-usual, as shown in Figure 8.

As can be seen with Figures 7 and 8, the multiple benefits of local food procurement advance multiple integrated planning approaches that are central for building regional resilience in Queensland.

> Food systems transformation is required to address the problem of millions of people not being able to afford healthy diets because of high food price and income constraints. At the same time, this transformation should create supportive food environments...
>
> (United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 24).

> Shifting to healthy diets that include sustainability considerations could help to reduce health and climate-change costs by 2030, as their hidden costs are lower compared with those of current food consumption patterns.
>
> (United Nations Report on the State of Food Security and Nutrition in the World 2020, p. 29, on the hidden health and environmental costs of what we eat).

Figure 8: Integrated planning approach for building regional resilience in Queensland



Source: QRA, 2021.

4 Socio-economic appreciation

Each local government authority has its own context to contend with in addressing the key considerations in Section 3.

In the following paragraphs we summarise the local context for the Cairns region, with regard to recent learnings about the impact of COVID-19 on social needs, and the variety and dynamics of vulnerable people who are faced with food disadvantage.

4.1 The impact of COVID-19 and social needs assessment

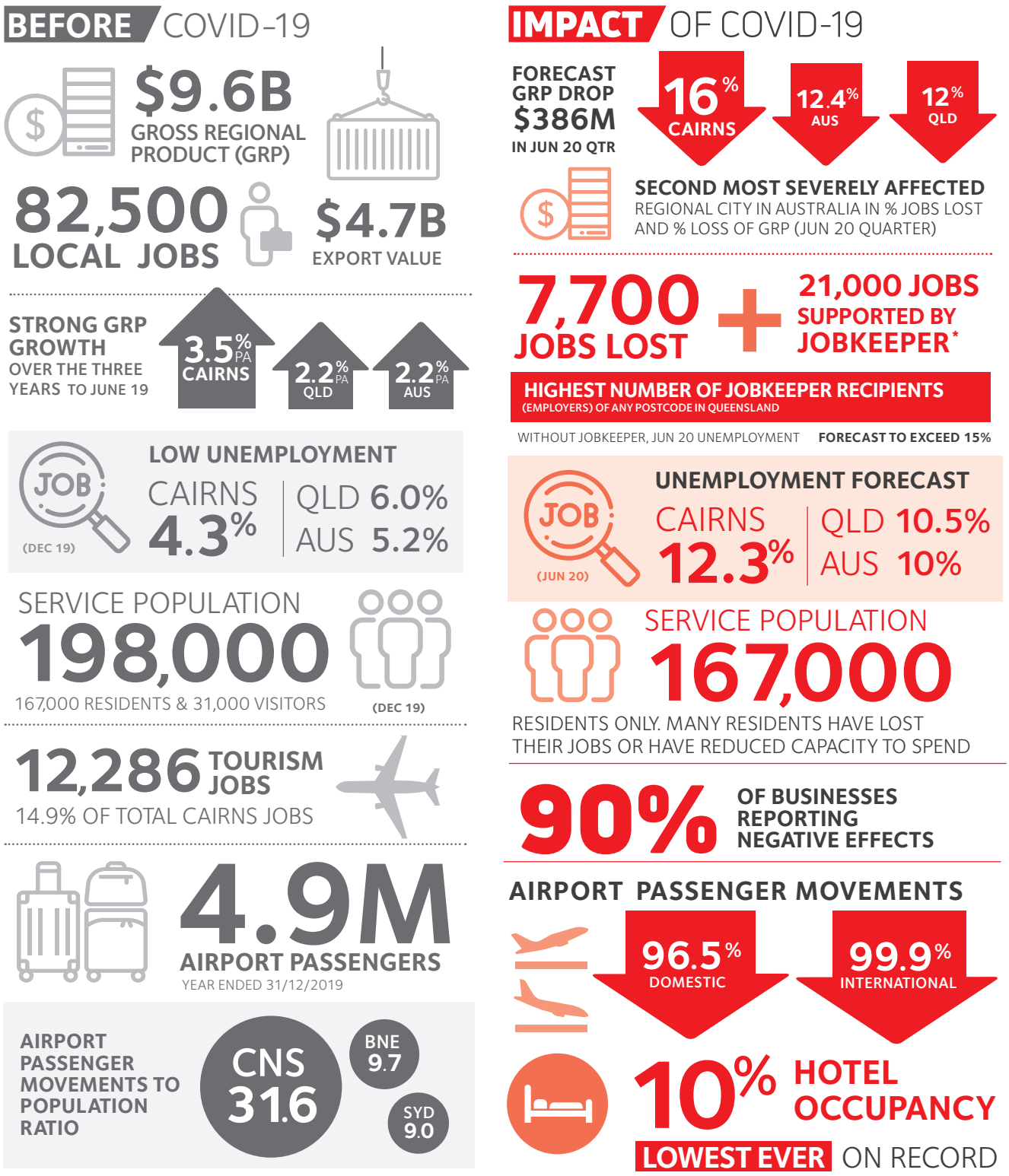
The tourist economy, upon which Cairns depends is set for decline in the years to come due to COVID-19 (Sexton-McGrath, 2020). Economically, the Cairns region is one of the hardest hit of any region in Australia prompting the *Cairns Pathway to Recovery from COVID-19* (CRC, 2020b).

Figure 9 illustrates the economic impacts identified by the CRC as of May of 2020.

Image 14: Tourists in a fresh food market

Source: iStock. (Credit: AleksandarNakic).

Figure 9: Cairns economic impact from COVID-19



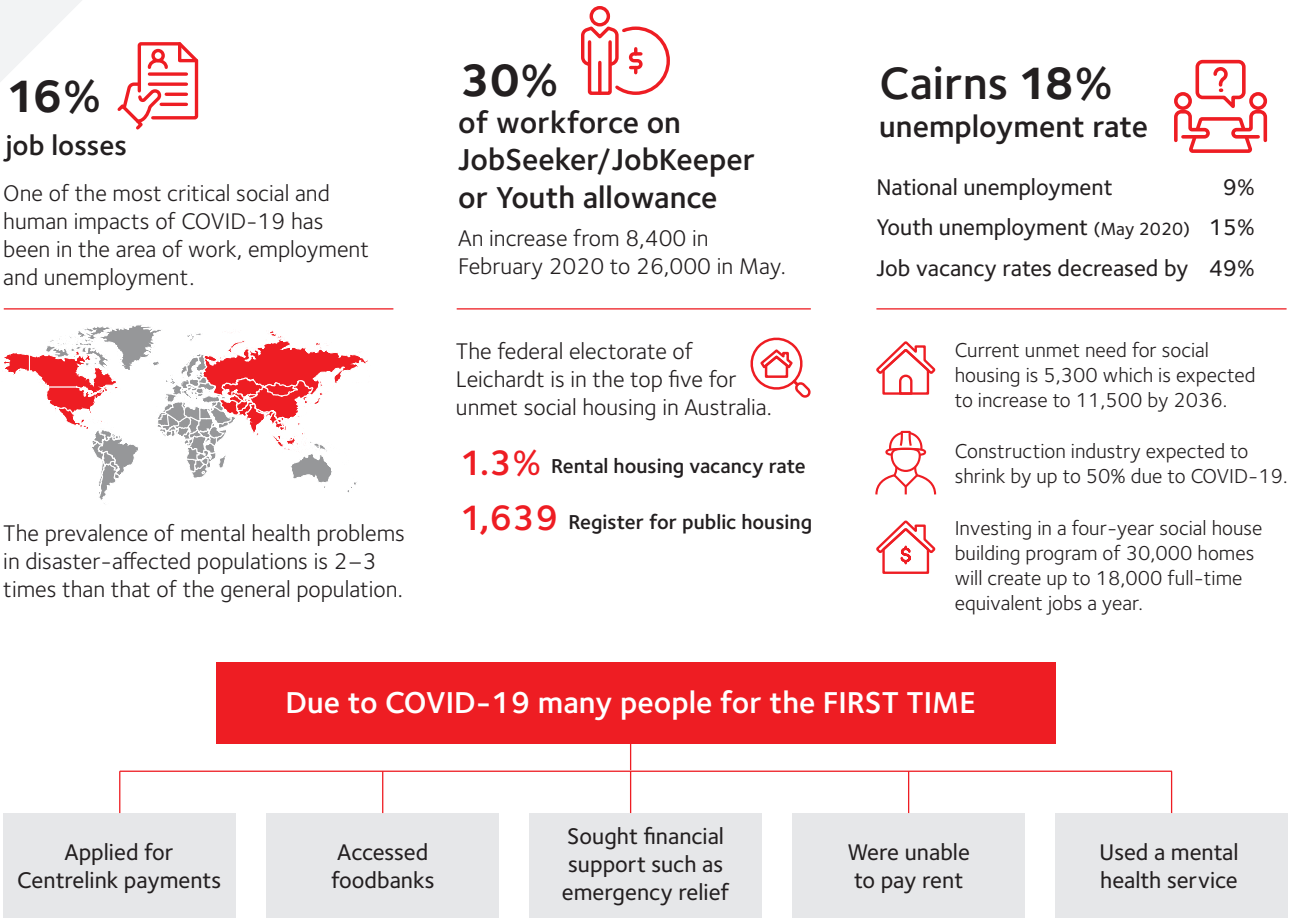
* Estimate based on a straight line labour force based pro-rata of national JobKeeper statistics

Source: CRC, 2020b.

The *Cairns Local COVID-19 Rapid Social Needs Assessment* provides the most up-to-date summary of key insights regarding the assessment of social needs in general within Cairns region (Babacan et al., 2020). As of September 2020, the authors identify the following stressors that are becoming exacerbated by COVID-19 impacts (See Figure 10 below).

The authors of this study identified that the financial impacts from COVID-19 within the Cairns region have seen people seeking emergency food relief for the first time in the lives and their experience of worry about accessing food (as a significant household expenditure) has affected mental health outcomes (Babacan et al., 2020, p. 3). The report identified the need to increase food security with improvements to the food supply chain logistics and a prioritised focus on the needs of the most vulnerable and disadvantaged groups in the Cairns region (Babacan et al., p. 65).

Figure 10: Exacerbated socio-economic stressors for the Cairns region due to COVID-19 impacts



Source: Babacan et al., 2020, p. 18.

4.2 The variety of vulnerable people to food disadvantage

The following information is drawn from the online survey and telephone interviews undertaken in 2020, with organisations that work with a range of clientele identified as the most vulnerable in the Cairns region.

The organisations in this study that work with vulnerable group types are summarised in Graph 1 (see Methodology).

Image 15: Red Cross volunteers in Cairns delivering relief packages to people in need

Source: Australian Red Cross, 2021.

4.2.1 Homeless citizens

The core business of the organisations outlined in Graph 1 (page 15) reveals a primary focus on assistance for the homeless including short-term crisis intervention, emergency accommodation and those at risk of homelessness. Those who are subject to lack of stable housing experience higher incidence and severity of food insecurity (Lee & Greif, 2008; Holland et al., 2011). The *Cairns Homelessness Community Action Plan* released by the Queensland Council of Social Services (QCOSS, 2013, p. 9) defines three types of homelessness, including:

1. **Primary homelessness:** Includes persons living on the street, sleeping in parks, squatting in derelict buildings, or using cars or railway carriages for temporary shelter;
2. **Secondary homelessness:** Describes people who move frequently from one form of temporary shelter to another such as: using emergency accommodation, youth refuges or women's refuges, residing temporarily with relatives or with friends and using boarding houses on an occasional or intermittent basis (up to 12 weeks); and
3. **Tertiary homelessness:** Describes people who live in premises where they don't have the security of a lease guaranteeing them accommodation, nor access to basic private facilities (such as a private bathroom, kitchen or living space). It can include people living in boarding houses on a medium to long-term basis (more than 13 weeks) or in caravan parks.

Of Queensland cities, Cairns has one of the highest rates of homelessness (QCOSS, 2013). Cairns is an Australian "hotspot" for homelessess (Babacan et al., 2020, p. 11) with significant challenges in "creating safe and secure communities for children" (Davis et al., 2016, p. 11).

A longitudinal study of homelessness in Queensland ending in 2015 indicated that there was generally proportionate homelessness between males and females (QCOSS, 2016). When age brackets are applied, however, there is a disproportionate amount of homeless young women in the Cairns region, aged between 21 and 30 years (QCOSS, 2016; Wallace et al., 2014).

Generally, a range of social pathologies are associated with homelessness in the Cairns region. Issues include leaving school early, prior to the end of grade 10 and physical and mental health issues are prevalent (QCOSS, 2016), as well as a regularity of cognitive impairment issues (Astill, 2017; QCOSS, 2016). Interviews with homeless people indicate that risky behaviour is common – exchanging sex for money, or running drugs – and there are generally traumatic histories, legal and financial issues, and a general feeling of powerlessness (QCOSS, 2016). Almost half of a cohort of homeless research participants in the Cairns region reported problematic use of alcohol, illegal drugs, over-the-counter medications, however, "these rates are analogous with those observed across Queensland" (QCOSS, 2016, p. 18). Imprisonment rates are high amongst Cairns homeless, with 62.5% of individuals indicating watch house or prison incarceration histories (QCOSS, 2016).

Homelessness, therefore, can be described as a is a "wicked problem" illustrating extreme complexities inherent in the following quote: "Factors identified as increasingly important in predicting the likelihood of a person experiencing an episode/s of homelessness include family breakdown, domestic and family violence, poverty and unemployment, and the consequences of mental illness. These factors are often experienced in combination" (QCOSS, 2013, p. 10).

Images 16 and 17: Homelessness in Cairns

Sources: Anglicare North Queensland Ltd, 2021 (left) and Rigby, 2015 (right).

4.2.2 Older people

The second most prevalent group supported by our surveyed organisations were those specialising in care for older people through care facilities and in-home support. Ageing populations are generally increasing across Australia, as such there is pressure on local agencies to provide services and support (Evans et al., 2017). People over 65 years of age in the Cairns Region make up 15.2% of the population (Australian Government, 2020b), slightly higher than the national average of 14% (Evans et al., 2017). Ageing in a cyclone prone region presents specific challenges. Outmigration leaves elderly residents needing to adjust to a changing climate with decreasing local family support. Whilst ageing in place is promoted by government policy and *in situ* care is increasingly available to older citizens in northern Queensland communities, ageing people still require additional assistance to meet their day-to day needs (Astill, 2017). During the onset of COVID-19 in 2020 and the requirements for social distancing, navigating information on the delivery of food was challenging for people in Cairns aged 65 and older (Babacan et al., 2020, p. 35).

The third most prevalent cohort supported by surveyed organisations is equally shared between three groups including those working with a range of physical disabilities; working with Australian First Nations/Indigenous peoples (consisting of Aboriginal and Torres Strait Islander cultural diversity); and then people from multicultural backgrounds where English is not necessarily the first spoken language and may require humanitarian support with resettlement from other countries.

> Many families help their loved ones to live independently by providing ongoing support, doing their shopping, driving them to appointments, mowing the lawn, fixing the things that go wrong around the house, supporting them financially, and generally tending to their needs.
>
> (Australia's Royal Commission into aged care quality and safety. Interim report, 2019, p. 2).

> Older people [with disability] may experience specific types of violence and abuse, including preventing access to their funds, theft or exploitation of assets, limiting or controlling communication or transport, and misuse of powers of attorney. Most violence and abuse of older people is committed by their adult children.
>
> (Australia's Royal Commission into violence, abuse, neglect and exploitation of people with a disability. Issues Paper: Violence and abuse of people with a disability at home, 2020b, p. 6).

4.2.3 People who experience a range of disabilities

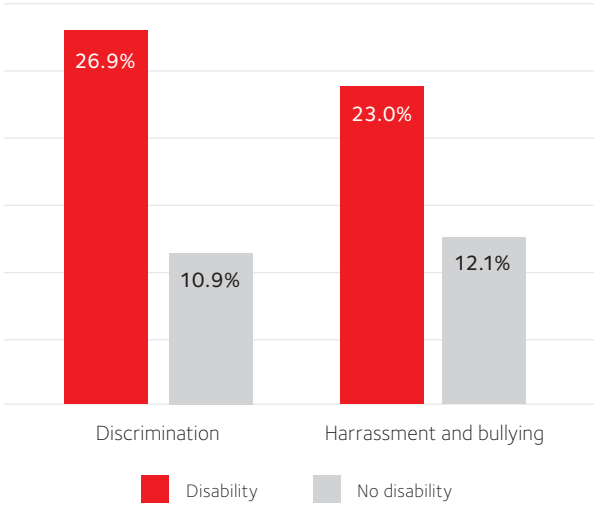
Persons with disability are considered to experience restriction in everyday activities for at least 6 months due to impairment or limitation of senses, physical or intellectual ability, psycho-social factors, injury and conditions (Australian Public Service Commission, 2020).

The 2016 census indicates that 4.4% of the Cairns population identifies with having some kind of disability requiring assistance with their day-to-day lives (.idcommunity, 2020c) and are among those significantly impacted by COVID-19 in the region (Babacan et al., 2020).

Individuals with a disability experience lack of employment with low income and "disproportionately experience poverty, lack of social support and structural exclusion" (Quall et al., 2018, p. 58) and harassment and bullying in the workplace (Commonwealth of Australia, 2020a) (See Graph 4 alongside).

Australia's *Royal Commission into Violence, Abuse, Neglect and Exploitation of People with a Disability* states that, they are more likely to feel unsafe in their home, experience homelessness and are "almost twice as likely to experience violence and abuse as people without disability" (Commonwealth of Australia, 2020c, p. 3). A 2020 study of socio-economic predictors of experiencing food insecurity in Tasmania during COVID-19 revealed higher chances for those with a disability (Kent et al., 2020).

Graph 4: Percentage of Australian disabled employees who have experienced discrimination, harassment or bullying, 2019



Source: Commonwealth of Australia, 2020a.

4.2.4 Aboriginal and Torres Strait Islander People

Aboriginal peoples and Torres Strait Islander experience of food security in **urban settings** revealed that, "food affordability relating to income and living expenses was a major barrier to a healthy diet with large household bills impacting food choice and meal quality. Access to family support was the main reported coping strategy" (McCarthy et al., 2018, p. 2649). For **remote settings**, indigenous populations were found to "experience a disproportionate burden of diet-related chronic disease" with associated issues in accessing affordable food from local stores (Ferguson et al., 2018, p. 2908). Another study on food insecurity among the **older** Aboriginal and Torres Strait Islander population revealed that 21% were food insecure, placing "this population at a 5 to 7-fold risk of experiencing food insecurity relative to their older non-Indigenous peers. Measures of geography, language and low socio-economic status were highly associated with exposure to food insecurity" (Temple & Russell, 2018, p. 1766). Furthermore, Aboriginal and Torres Strait Islanders "disproportionately experience homelessness in Queensland" than other cohorts (QCOSS, 2013, p. 11).

The Traditional Owners continue to assert their rights and identities and maintain active cultural and spiritual connections with the region through environmental protection and conservation and supporting livelihoods (Dawul Wuru Aboriginal Corporation, 2021). Today, Aboriginal and Torres Strait Islander people make up 10% of the general population of the Cairns Region (Australian Government, 2020b). In the Cairns region, like other places in Australia, "there is a significant gap in mental health and life outcomes with Aboriginal peoples and Torres Strait Islanders being more likely to: experience psychological distress, be hospitalised for mental health conditions, die by suicide, and experience problematic alcohol and other drug use" (Queensland Government, 2016, p. 4). Due to compounding pressures, Aboriginal and Torres Strait Islanders can be considered to be at a high risk in any public health emergency (Department of Health, 2021).

4.2.5 People from multicultural backgrounds where English is not the first language and refugees

Data on the country of birth for people within the Cairns region indicates that 21.4% of the local population were born overseas. United Kingdom, New Zealand, Papua New Guinea, Philippines, and Japan are the top five places of origin of immigrants in Cairns (.idcommunity, 2020a). As a result of this immigration, 13% of the population speaks another language other than English, where 2% of the Cairns population speaks another language and does not speak English well or at all (.idcommunity, 2020d). Pacific Islanders and some countries in South-East Asia are more at risk of homelessness, and hence food insecurities include Papua New Guinea, the Cook Islands, Fiji, Tonga, Nuie, Maori, Bhutan, South Korea, Hmong, Philippines and Montenegro (Dawes & Gopalkrishnan, 2014, p. 4).

"Although Australia is often assumed to be food secure" (RIRDC, 2016, p. 12), Culturally And Linguistically Diverse (CALD) peoples can experience food insecurity. A North Queensland study found that CALD elderly were more likely to experience barriers, or have potentially limiting factors, on their "ability to access, prepare and consume nutritious foods", compared to the elderly from other backgrounds (Millichamp & Gallegos, 2011, p 7). The authors indicate that preferences for certain foods factor on a range of individual choices, one of which is most certainly cultural (Millichamp & Gallegos, 2011). Therefore, culturally appropriate foods and means of distribution and services inform appropriate nutrition and food needs. Cairns is one of the main Queensland cities that resettles refugees (See Figure 11 below).

Figure 11: Snapshot of refugees in Queensland

Source: Queensland Health, 2017.

4.2.6 Disengaged youth

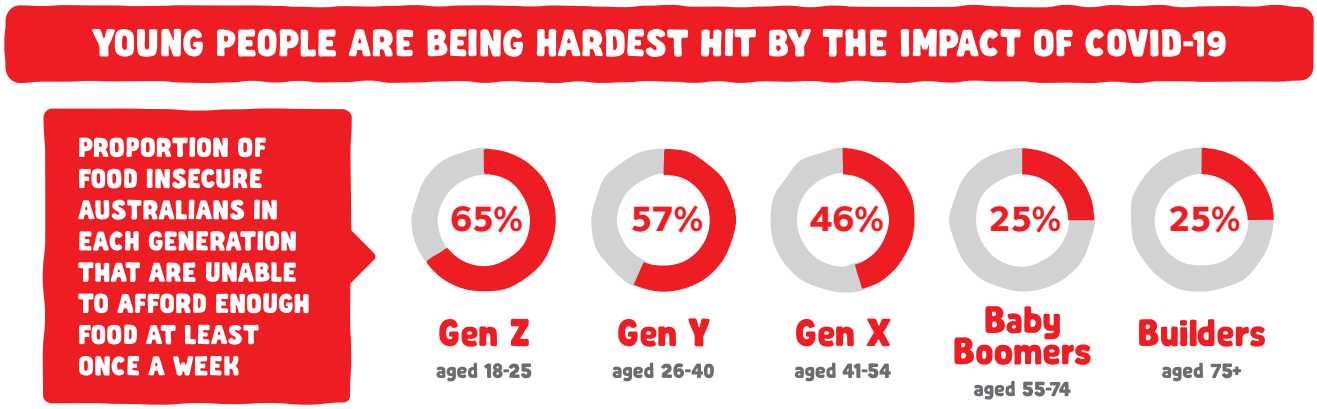
The next group supported by the surveyed organisations consists of those working with youth and involved in providing temporary accommodation, young parent support and financial assistance. Disengaged youth are defined as people between the ages of 15 and 24 years that are not connected to employment or education. A history of caretaker neglect (Whitbeck et al., 2006) and the low-income prospects for disengaged youth increases the 'hand to mouth existence' that is a key feature (Tarasuk et al., 2009).

The study by Davis et al. on the children and youth in the Cairns southern corridor, reports that the "rate of young people aged 0-24 who are homeless as a proportion of the overall homeless population is high" (2016, p. 11). Cairns experiences a 12.8% rate of disengaged youth (.idcommunity, 2020b). Young people in the Cairns region who have experienced the "first time" impacts of COVID-19 have also lodged applications for Centrelink payments such as the Youth Allowance and JobSeeker for the first time and in greater numbers (Babacan et al., 2020, p. 18).

With the recent compounding effects of COVID-19, the FNQ Youth Assistance Fund (2021) provides financial support to access food and medicine. Affordability to purchase supplies for basic needs is a day-to-day challenge (FoodBank, 2020c). Figure 12 illustrates the growing proportion of food insecure young people across the generations.

The *Royal Commission into National Natural Disaster Arrangements Report* (2020a, p. 332) also noted the particular vulnerability of children and young people during the bushfire events of 2019 and their higher potential exposure to, and negative health outcomes from facing natural disasters. With the high reliance in Cairns on the tourism industry, youth unemployment has spiked due to the shutdown of tourist-related labour-markets such as hospitality, recreation and retail (Babacan et al., 2020).

Figure 12: Impact of COVID-19 on the food security of young people in Australia



Source: FoodBank, 2020c.

4.2.7 People experiencing multiple complex needs

Finally, people with multiple complex needs were also represented in this study including services such as welfare support, capacity building and community development programmes. A variety of compounding issues may be present including issues resident within the lists above and additionally including: acute and chronic poverty; complex health conditions requiring rehabilitation and transition from hospital or organisational care to greater degrees of independent living; child safety; parenting support and training; and domestic violence intervention.

COVID-19 lockdown measures and the requirements to stay within the home over protracted periods has raised concerns about exposure to domestic violence (Peterman et al., 2020). Due to the impact of COVID-19, the Queensland Government is set to invest "$3.8 million in 2020-21 out of a $70 million total spend to construct a new 53 bed mental health facility" in the Cairns Hospital Mental Health Unit, under the provisions of the *Far North Queensland Regional Economic Recovery* plan (Queensland Government, 2020a, p. 10).

4.2.8 Emergent groups outside the study

Two emergent groups experiencing food insecurity since the pandemic that were not researched as part of the Griffith University study include international students, who are ineligible to access JobSeeker or JobKeeper payments the casual workforce (FoodBank, 2020b).

Image 18: Food outlet for international students and casual workers asking for food relief

Source: Henriques-Gomes, 2020 (Photograph: Asanka Ratnayake/Getty Images).

> We've found that throughout all of COVID up until now we have had between a 20-25% increase in demand. But we also helped another church start a charity to assist international students. We would have literally doubled our demand if we had not helped them set up. The reason I tell you that is because it's the true demand, not just the increase we've seen but a whole new charity started fresh because of COVID.
>
> (Quote from a charity in Australia's FoodBank Hunger Report 2020, p. 11).

> Four in five Australians receiving the JobSeeker payment (80%) expect a $300 cut to the payment would mean they would definitely have to both skip meals and reduce how much fresh fruit and vegetables they buy.
>
> (Australia's FoodBank Hunger Report 2020, p. 18).

Government funded JobSeeker payments and the JobKeeper wage subsidy are estimated to have kept 2.2 million Australians out of poverty so far (Henriques-Gomes 2020; Phillips et al., 2020).

This fiscal intervention provides temporary relief and the Australian Council of Social Services (ACOSS) advises that, "the forthcoming removal of these supports are likely to result in increased inequality unless they can be replaced by strong employment growth and an adequate, permanent increase in unemployment payments" (Davidson et al., 2020, p. 7).

The World Economic Forum advocates that a universal and basic income may be necessary to address food inequalities exposed by COVID-19 (Wignaraja & Horvath, 2020).

Klassen and Murphy (2020) caution that those who experience food insecurity are more likely to endure health conditions that exacerbate COVID-19 symptoms. The removal of these fiscal interventions in April 2021 and its impact upon the experience of food insecurity in the Cairns region and Australia-wide is yet to be revealed.

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