BUILDING THE RESILIENCE OF MELBOURNE'S FOOD SYSTEM – A ROADMAP

A Foodprint Melbourne Report

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Table of Contents

Executive summary

This report outlines a 'roadmap' of recommendations for increasing the resilience of Melbourne's food system to shocks and stresses related to climate change and pandemic. This roadmap was developed through a collaborative co-design process with stakeholders. The research findings include:

- Recent shocks related to the **COVID-19 pandemic and the 2019-2020 bushfires** have revealed vulnerabilities in Melbourne's food system and created an opportunity to strengthen the resilience of the city's food system to future shocks
- Melbourne's food system will face **more frequent shocks in future due to climate change**, including drought, heatwaves, storms and floods
- Shocks and stresses **increase food prices and food insecurity**, with the greatest impacts on those on low incomes who are already at risk
- There are **six key areas of opportunity** for strengthening the long-term resilience of Melbourne's food system to shocks and stresses – equitable access to nutritious food, regenerative and agroecological production systems, protected closed-loop and urban agriculture, circular food economies, local and regional food supply chains and sustainable livelihoods
- These six key areas of opportunity **align to ten of the 17 UN Sustainable Development Goals**
- **A Victorian food resilience plan** should be developed to strengthen the resilience of the state's food system to future shocks and stresses
- **Self-determination and food sovereignty of Victoria's First Nations peoples** should be at the centre of the state's food resilience plan. The plan should recognise the role of First Nations peoples as Custodians of the land, waterways and biodiversity that underpin our food system and their deep knowledge of sustainable land management
- Clear **state and local government responsibility** should be established for ensuring the food security of Victorians
- The **Human Right to Food should be legislated in Victoria** and should underpin all policy and initiatives to address food insecurity in the state
- **Regenerative and agroecological farming approaches** should be supported as part of a diverse suite of approaches to sustainable agriculture
- A 'whole of government' policy framework should be developed to **promote protected closed-loop agriculture and urban agriculture**
- **A circular food economy** should be promoted in the Melbourne region to maximise the use of limited natural resources that underpin the food system
- **Local and regional food supply chains should be strengthened** by investing in shared and decentralised infrastructure for local food processing and distribution
- **Sustainable livelihoods should be promoted** for farmers and all workers throughout the food system through initiatives to improve working conditions, support diverse career and training pathways and support new farmers to access land, training and capital

SECTION 1

Introduction

1.1 Acknowledgement

We begin this report by acknowledging the Traditional Owners and Custodians of the unceded lands that the report focuses on – Narrm, the Melbourne region, and its surrounding areas.[1] We pay our respects to the Traditional Owners of these lands and their Elders – the Bunurong Boon Wurrung, Dja Dja Wurrung, Eastern Marr, Gulidjan, Gadubanud, Taungurung, Wadawurrung, Wathaurong and Wurundjeri Woi Wurrung peoples – and we acknowledge their careful management of these lands over tens of thousands of years. The First Peoples of this region have produced food on these lands for millennia, taking only what was needed and caring for Country. We recognise the importance of their knowledge and practices in food production and land management for a resilient and sustainable food system for the region.

1.2 About this report

This report from the *Foodprint Melbourne* research project presents a roadmap of strategies and policy approaches for strengthening the resilience of Melbourne's[2] food system to shocks and stresses. It focuses particularly on shocks and stresses related to climate change and pandemic, but also considers underlying food system stresses, such as high levels of food waste and declining supplies of the natural resources that underpin food production. The combined effects of these shocks and stresses undermine the resilience of food systems, drive up food prices and increase food insecurity.[3]

The report identifies six key areas of opportunity for action to strengthen the resilience of Melbourne's food system to future shocks and stresses:

- Equitable access to nutritious food
- Regenerative and agroecological production systems
- Protected closed-loop and urban agriculture
- Circular food economies
- Local and regional food supply chains
- Sustainable livelihoods

These areas of opportunity emerged from a series of interviews and co-design workshops with stakeholders (see section 1.4). They highlight actions that are likely to increase the long-term underlying resilience of Melbourne's food system to a broad range of potential shocks or stresses, rather than focusing on any one particular hazard that may affect the city's food system in future.[4] The report also highlights the importance of taking an integrated approach that includes actions across relevant policy portfolios that influence the resilience of the food system.

This report builds on the findings of the report *The resilience of Melbourne's food system to climate and pandemic shocks*, which identifies the impacts of climate shocks and the COVID-19 pandemic on Melbourne's food system, vulnerabilities in the city's food system and the opportunities to build the resilience of the city's food system to future shocks and stresses.

1 For details of the region that this report focuses on, see section 1.4 and Appendix A.

2 The geographic focus of this research is the 31 local government areas that make up Metropolitan Melbourne and another 9 local government areas that form a second peri-urban ring around Greater Melbourne. For a full list of the local governments included see Appendix A.

3 Mbow, C. et al. (2019) Food Security, in *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. P.R. Shukla, et al., Editors.

4 For details of the hazards facing Melbourne's food system and their impacts, see the report Murphy, M., Carey, R. and Alexandra, L. (2022) *The resilience of Melbourne's food system to climate and pandemic shocks*. University of Melbourne, Australia.

1.3 About the Foodprint Melbourne project

The Foodprint Melbourne project is based in the Faculty of Veterinary and Agricultural Sciences at the University of Melbourne. The project is funded by the Lord Mayor's Charitable Foundation and involves a number of project partners, including the City of Melbourne and other local governments in Melbourne's city region.[5]

Previous phases of the Foodprint Melbourne project generated an evidence base about the significance of Melbourne's foodbowl to the city's food supply in the context of a rapidly growing population and pressures on food production from climate change and declining supplies of natural resources, such as land and water. The project developed a roadmap to strengthen the resilience of food production in Melbourne's foodbowl.

This phase of the project extends this earlier research by addressing resilience across the city's food system – from production through processing, distribution, retail, consumption and "waste resources". It focuses on the resilience of the city's food system to sudden climate shocks, such as bushfires and floods, as well as ongoing stresses, such as droughts. It also includes a focus on pandemic shocks to the food system. The research draws on the 'city region food system' approach developed by the Food and Agriculture Organization of the United Nations in partnership with RUAF.[6]

1.4 Our approach

The recommendations presented in this report have been informed by (i) a desktop review of policies that influence the resilience of Melbourne's food system at federal, state and local government level (ii) interviews with Victorian (and Australian) stakeholders about the resilience of Melbourne's food system to shocks and stresses (iii) case studies of international and Australian best practice that identify policy approaches of relevance to Melbourne, and (iv) co-design workshops with Victorian stakeholders.

This research was informed by discussions and exchanges with the Food and Agriculture Organization of the United Nations and RUAF as part of the City Region Food System (CRFS) Programme. Our independent project in Melbourne was not a formal participant in the CRFS Programme. However, it built on the FAO-RUAF CRFS approach and methodology and shadowed other cities participating in a CRFS project to assess their resilience to climate and pandemic shocks, and exchanges took place on approaches, methodologies and the overall process followed.

Desktop review included a review of the federal, state and local government policy influences on the resilience of Melbourne's food system. The review focused particularly on policy influences on the governance of food supply chains during a shock to the food system and the governance of food relief. This included analysis of relevant policy documents, legislation, reports of government inquiries, media releases and the websites of government departments.

Interviews were conducted with 41 stakeholders (in 34 interviews, some involving more than one participant). Participants came from state and local government, industry (including farmers) and civil society groups. Interviews lasted 45-60 minutes and were recorded with the consent of interviewees.

Case studies of international and Australian best practice were based on desktop review of relevant documents and included Amsterdam (Netherlands), Christchurch (New Zealand), Singapore, Washington DC and New York (USA). Australian case studies focused on Brisbane, Melbourne and regional Victoria.

5 For a full list of project partners, see Appendix B.

6 See www.fao.org/in-action/food-for-cities-programme/overview/crfs/en/

Co-design workshops were conducted between October 2020 and May 2021 with participants from government, industry and civil society. Five workshops were conducted with around 24 participants per workshop, and 81 participants were involved in total (some participants attended more than one workshop). Workshops were conducted on Zoom due to COVID-19 restrictions.

During workshops, participants were asked to work in cross-sector teams (involving stakeholders from local and state government departments, industry and civil society groups) to identify strategies to strengthen the resilience of Melbourne's system. A 'co-design' approach was adopted, in which representatives of key stakeholder groups collaborated in the workshops on developing solutions. Participants were asked to consent to the use of the 'Chatham House Rule' during workshops, in which they were free to use information gained during the workshop, but not to reveal the identity of participants. The participants and organisations involved are also not identified here.

Melbourne's city region was the focus of our assessment. This region was defined as the 31 local government areas that make up Metropolitan Melbourne and another 9 local government areas that form a second peri-urban ring around Greater Melbourne. References to 'Melbourne' and 'the Melbourne region' in this report refer to Melbourne's city region. For a full list of the local government areas in this region, see Appendix A.

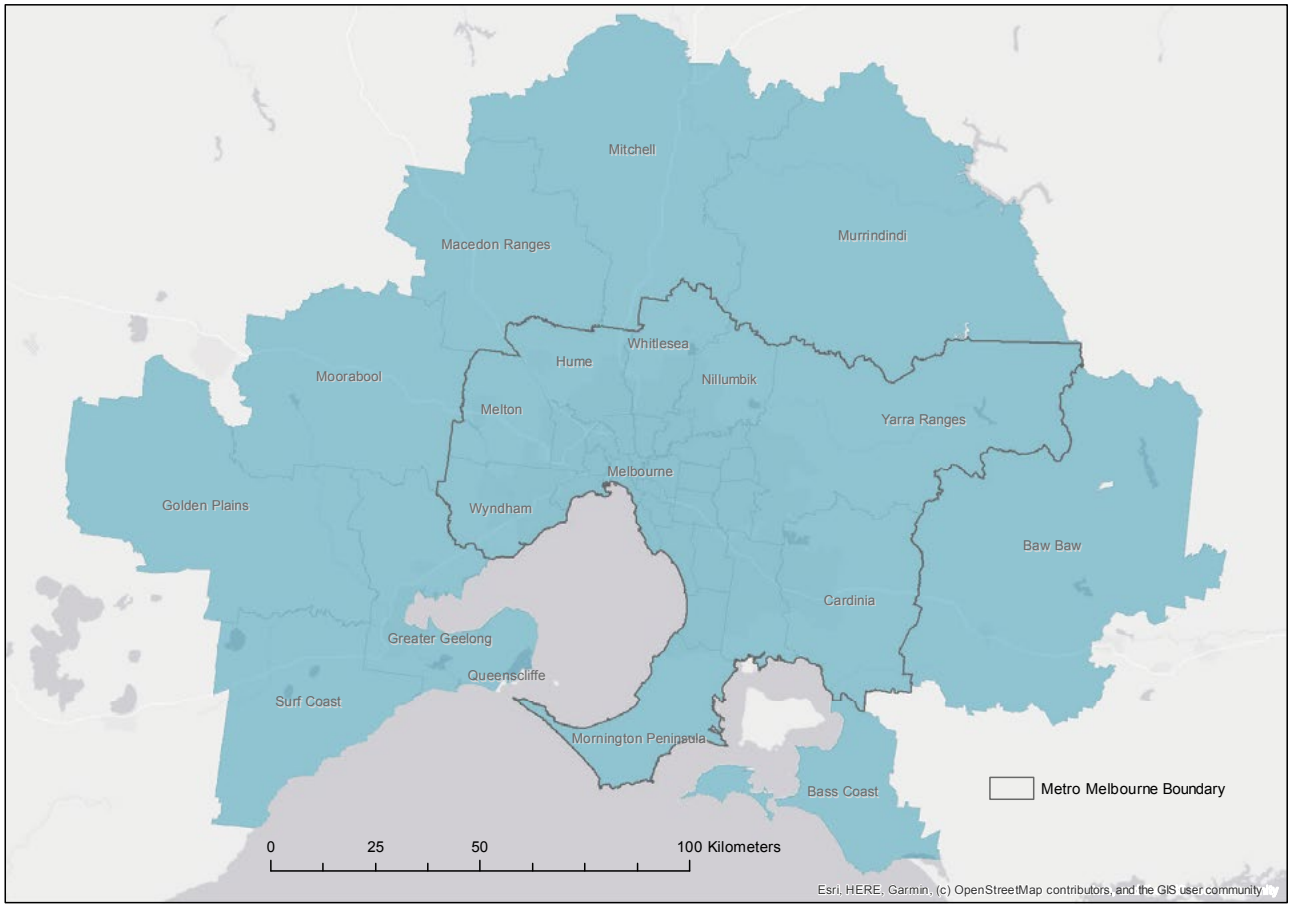
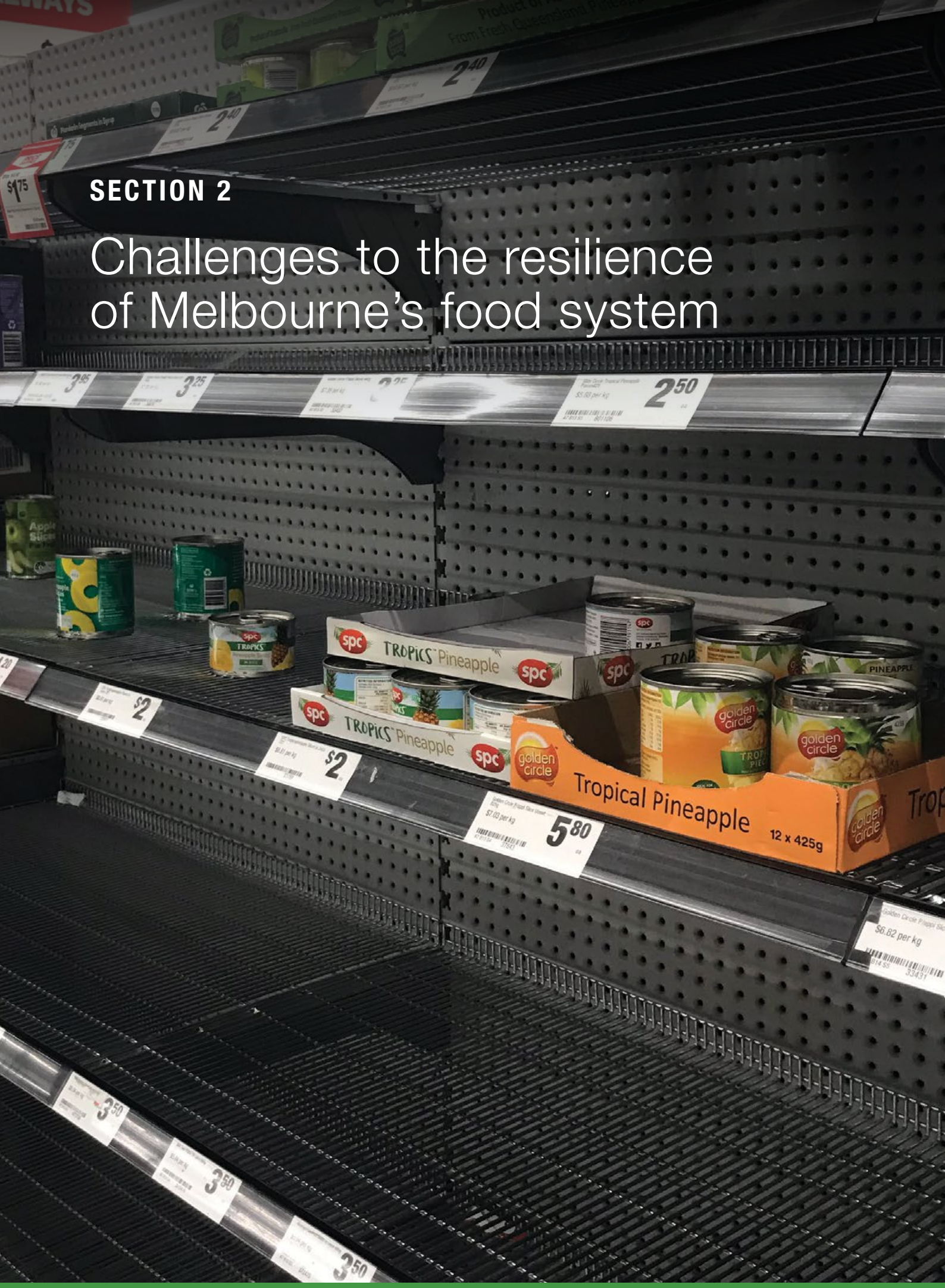


Figure 1. Melbourne's city region

SECTION 2

Challenges to the resilience of Melbourne's food system



2.1 Introduction

During the COVID-19 pandemic, many people in Melbourne experienced disruption to their food supply. People were faced with empty supermarket shelves or gaps in product availability at times. Some of these temporary food shortages were due to a sudden increase in consumer demand for staple foods during lockdowns.[7] However, the pandemic also had widespread impacts throughout food supply chains, disrupting the production and harvesting of crops, food processing, distribution and transport systems and the hospitality sector.[8]

Pandemic is not the only shock that has affected Melbourne's food system in recent years. The COVID-19 pandemic came shortly after major bushfires in south-east Australia in 2019 and 2020, which had impacts throughout food supply chains that included crop damage, livestock losses, transport disruption and the closure of food retail stores in affected areas.[9] When multiple shocks to food systems co-occur or follow closely on each other, it can have a compounding effect and leaves little time for food systems to recover in between shocks.[10]

Food systems around the world are being disrupted more often and more severely

Food systems around the world are being disrupted more often and more severely, particularly due to climate change.[11] Climate change is likely to lead to more frequent and more severe droughts in south-east Australia,[12] as well as more frequent heatwaves, bushfires, storms and floods.[13] Extreme flooding in South Australia, New South Wales and Queensland in early 2022 had significant impacts on food systems in those states, cutting major food supply routes and inundating crops.[14,15]

Melbourne's food system will also feel the impacts of global geopolitical shocks, such as Russia's invasion of Ukraine in 2022. Ukraine and Russia account for almost a third of the world's wheat exports.[16] Wheat is a key ingredient in many processed foods and is used as a feedstock for livestock.[17] Russia is also a major global exporter of fertilisers, which are expected to increase in price.[18] The impacts of the crisis on rising oil prices will affect many parts of the food system, including the cost of fuel for farm machinery and food freight.[19]

In addition to these climate, pandemic and geopolitical shocks, the resilience of food systems is affected by ongoing environmental stresses. These stresses include high levels of food waste and the impacts of intensive agriculture, which undermine the natural resource base on which food production depends.[20] The recommendations in this report aim to increase the resilience of Melbourne's food system to these long-term ecological stresses, as well as to sudden shocks.

7 Carey, R., Murphy, M., and Alexandra, L. (2020) COVID-19 highlights the need to plan for healthy, equitable and resilient food systems. *Cities & Health*, 1-4. DOI: 10.1080/23748834.2020.1791442.

8 See Murphy, M. et al. (2022) *The resilience of Melbourne's food system to climate and pandemic shocks*. University of Melbourne, Australia.

9 Murphy, M. et al. (2022) As above.

10 IPCC (2022) Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.

11 IPCC (2022) As above.

12 Grose, M. et al. (2015) *Southern Slopes Cluster Report, Climate Change in Australia Projections for Australia's Natural Resource Management Regions*: Cluster Reports. eds. Ekström, M. et al., CSIRO and Bureau of Meteorology, Australia

13 IPCC (2022) As above.

14 Carey, R., Alexandra, L. and Murphy, M. (2022) We can't keep relying on charities and the food industry to supply food after disasters – the government must lead. *The Conversation*, 4 March 2022.

15 AAP (2022) South Australia floods spark food shortage fears in WA, Darwin and remote towns, *The Guardian*, 29 January 2022. Available: www.theguardian.com/australia-news/2022/jan/29/south-australia-floods-spark-food-shortage-fears-in-wa-darwin-and-remote-towns (accessed 29 March 2022).

16 OEC data for 2020 – https://oec.world/en/profile/hs92/wheat

17 Agriculture Victoria (2020) *A guide to introducing grain to sheep and cattle*. Available: https://agriculture.vic.gov.au/__data/assets/pdf_file/0005/567104/Introducing-grain-to-sheep-and-cattle.pdf (accessed 29 March 2022).

18 Australian Trade and Investment Commission (2022) *Insight – Farm, food costs rise due to higher energy prices*. 4 March 2022. Available: www.austrade.gov.au/news/insights/insight-farm-food-costs-rise-due-to-higher-energy-prices (accessed 9 April 2022).

19 Weersink, A. and von Massow, M. (2022) How the war in Ukraine will affect food prices. *The Conversation*, 15 March 2022.

20 See Murphy, M. et al. (2022) *The resilience of Melbourne's food system to climate and pandemic shocks*. University of Melbourne, Australia.

Food system resilience

Food system resilience means that the food system can continue to deliver an adequate supply of nutritious and culturally acceptable food to everyone, even during shocks to the system.[21] Resilience is also about the capacity of the food system to adapt to changing circumstances and to transform, building longer term resilience to future shocks and stresses.[22] Community resilience is central to the resilience of the food system – our capacity to respond personally and collectively.[23]

2.2 Food insecurity

Food system shocks lead to rising food insecurity, with the greatest impacts on those who are already at risk of food insecurity.[24] During the first year of the COVID-19 pandemic in 2020, there was a 47% increase in demand for food relief from charities in Australia.[25] New groups of people began experiencing food insecurity due to the economic crisis accompanying COVID-19. They included casual workers who had lost jobs and people on temporary visas who were ineligible for government support, such as international students.[26]

Food system shocks lead to rising food insecurity

Even prior to the pandemic, significant numbers of Victorians could not afford to buy enough food. In 2014, around 4% of Victoria's population (or 164,000 adults) ran out of money to buy food and around 13% were worried about running out of money to buy food.[27] Rates of food insecurity are significantly higher among some population groups, such as Aboriginal Victorians, lone parents and those who are unemployed or on low incomes.[28]

The drivers of food insecurity are complex, but a key driver is low income. Households on low incomes spend more of their disposable income on food than those on higher incomes,[29] and are particularly vulnerable to rising food prices and other cost of living pressures. Food prices are rising due to a combination of pressures, including the COVID-19 pandemic and climate shocks.[30,31] The pressures on food prices are a long-term trend, and as food prices continue to rise, more vulnerable Victorians will become food insecure.

21 Candy, S., Biggs, C., Larsen, K., and Turner, G. (2015) Modelling food system resilience: A scenario-based simulation modelling approach to explore future shocks and adaptations in the Australian food system. *Journal of Environmental Studies and Sciences* 5 (4): 712–731.

22 Biehl, E., Buzogany, S., Baja, K. and Neff, R. (2018) Planning for a resilient urban food system: A case study from Baltimore City, Maryland. *Journal of Agriculture, Food Systems and Community Development* 8 (2): 39-53.

23 Smith, K. and Lawrence, G. (2014) Flooding and food security: A case study of community resilience in Rockhampton. *Rural Society* 23 (3): 216-228.

24 Kent, K., Murray, S., Penrose, B., Auckland, S., Godrich, S., Lester, E. and Visentin, D. (2022) Food insecure households faced greater challenges putting food on the table during the COVID-19 pandemic in Australia. *Appetite* 169. 105815.

25 Foodbank Australia (2020) *Foodbank hunger report 2020*. Sydney, Australia.

26 McKay, F., Bastian, A. and Lindberg, R. (2021) Exploring the response of the Victorian emergency and community food sector to the COVID-19 pandemic. *Journal of Hunger and Environmental Nutrition* 16 (4): 447-446.

27 Victorian Agency for Health Information (2017) *Challenges to healthy eating – food insecurity in Victoria: findings from the 2014 Victorian Population Health Survey*. Melbourne, Australia.

28 Victorian Agency for Health Information (2017) As above.

29 McKay, F. et al. (2021) As above.

30 Louie, S., Shi, Y. and Allman-Farinelli, M. (2022) The effects of the COVID-19 pandemic on food security in Australia: A scoping review. *Nutrition & Dietetics* 79 (1): 28-47.

31 IPCC (2022) As above.

Figure 2. Australia's food security problem

Food security

The Food and Agriculture Organization of the United Nations defines food security as "a situation that exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". There are six key dimensions of food security: the *availability* of food in the food supply, having the financial means to *access* adequate food, having the means for *utilization* of food, *stability* of food supply during shocks to the food system, *sustainability* in food production so that current generations can meet their food needs without compromising the capacity of future generations to feed themselves, and *agency* so that people can make their own choices about what they eat and can engage in decisions that shape food systems.[32]

2.3 Vulnerability of food supply chains to shocks

Early in the COVID-19 pandemic, the Australian Government reassured Australians that the nation's food supply was secure, because the country produces and exports a lot of food.[33] Around 90% of fresh foods available in Australian supermarkets are produced in Australia.[34] Australian farmers and agri-food companies adapted and innovated throughout the COVID-19 pandemic to keep Australians supplied with food.[35] However, the COVID-19 pandemic and the bushfires in south-east Australia in 2019 and early 2020 also highlighted many vulnerabilities in food supply chains and the importance of strengthening the resilience of Melbourne's food supply to future shocks.[36]

Long supply chains have many potential points of disruption

Supermarkets rely on complex global supply chains to maintain consistent supplies of fresh and processed food from wherever it is seasonally available or from where it can be produced cost effectively. These long supply chains have many potential points of disruption.[37,38] During the COVID-19 pandemic, food supply chains were affected by border closures and transport disruption.[39] Road closures also disrupted food freight in Victoria during the 2019-2020 bushfires[40], and in 2022, extensive flooding in South Australia[41], New South Wales and Queensland cut food supply routes, leading to temporary food shortages in some areas.[42] Food freight into Melbourne has the potential to be disrupted by a major bushfire or flooding event.[43] These types of extreme weather events are likely to become more frequent and more severe due to climate change.[44]

32 HLPE (2020) *Food security and nutrition: building a global narrative towards 2030*. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome, Italy.

33 ABARES (2020) *Australian food security and the Covid-19 pandemic*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, Australia.

34 Department of Agriculture, Water and the Environment (2020) *Food*. Available: https://www.awe.gov.au/agriculture-land/farm-food-drought/food (accessed 29 March 2022).

35 Murphy, M., Carey, R. and Alexandra, L. (2022) *The resilience of Melbourne's food system to climate and pandemic shocks*. University of Melbourne, Australia.

36 Murphy, M., Carey, R. and Alexandra, L. (2022) As above.

37 Ali, I., Arslan, A., Chowdury, M., Kahn, Z. and Tarba, S. (2022) Reimagining global food value chains through effective resilience to COVID-19 shocks and similar future events: A dynamic capability perspective. *Journal of Business Research* 141: 1-12.

38 Ihle, R., Rubin, O., Bar-Nahum, Z. and Jongeneel, R. (2020) Imperfect food markets in times of crisis: economic consequences of supply chain disruptions and fragmentation for local market power and urban vulnerability. *Food Security* 12 (4): 727-734.

39 Murphy, M., Carey, R. and Alexandra, L. (2022) As above.

40 Sideek, A. (2020) Australia's bushfires could affect cost and availability of fresh local produce. *The Guardian*, 17 January 2020. Available: www.theguardian.com/australia-news/2020/jan/17/australias-bushfires-could-affect-cost-and-availability-of-fresh-local-produce (accessed 29 March 2022).

41 AAP (2022) South Australia floods spark food shortage fears in WA, Darwin and remote towns. *The Guardian*, 29 January 2022. Available: www.theguardian.com/australia-news/2022/jan/29/south-australia-floods-spark-food-shortage-fears-in-wa-darwin-and-remote-towns (accessed 29 March 2022).

42 Knaus, C. and Tondorf, C. (2022) 'Nothing to sell': NSW and Queensland flood waters hit supermarkets and grocery supplies. *The Guardian*, 2 March 2022. Available: www.theguardian.com/australia-news/2022/mar/02/nothing-to-sell-queensland-and-nsw-flood-waters-hit-supermarket-grocery-supplies (accessed 29 March, 2022).

43 Murphy, M., Carey, R. and Alexandra, L. (2022) As above.

44 IPCC (2022) As above.

Food supply chains are highly dependent on labour. During the COVID-19 pandemic, labour shortages affected all parts of food supply chains, from a lack of seasonal labour on farms due to border closures and restrictions on movement between states[45], to labour shortages in retail stores and hospitality during the Omicron wave.[46] COVID-19 cases were particularly disruptive in large scale supermarket distribution centres and food processing plants such as abattoirs and meat processing plants throughout the pandemic, and some were forced to close.[47,48]

Food supply chains are highly concentrated. A small number of players dominate key sectors, such as retail, and supply chains for commodities such as chicken meat and dairy. These companies may have just one or two processing centres in a region, and each of the major supermarkets has just a couple of distribution centres in the Melbourne region.[49] In a global pandemic, this highly centralised model of food supply chains is a significant risk.

2.4 Insecure livelihoods in the agriculture and food industries

The livelihoods of Victorian farmers are under pressure from a growing 'cost price squeeze'. The cost of farm inputs, such as fuel, fertilisers and farm chemicals is rising[50], while there is downward pressure on food prices from the major supermarkets[51] and due to competition from cheap food imports. Farmer livelihoods are also affected by the impacts of climate shocks and stresses[52] and disruption due to the pandemic, which has increased the costs of labour and freight.[53,54]

Farmers in Melbourne's foodbowl face additional pressures due to the high cost of farming close to the city. They pay higher prices for farmland, fueled by speculative investment in land close to Melbourne's Urban Growth Boundary, and also higher local government rates. This creates further barriers to entry for new farmers in the region.[55]

45 Sullivan, K (2020) Coronavirus restrictions could lead to 26,000 person shortfall for coming harvests, report says. *ABC News* 30 September 2020. Available: /www.abc.net.au/news/2020-09-30/coronavirus-farm-worker-shortage-coming-harvests/12714694 (accessed 29 March 2022).

46 Wooton, H. and Marin-Guzman, D. (2022) It's 'like a lockdown': Omicron chaos crippling business. *Australian Financial Review* 6 January 2022. Available: www.afr.com/politics/federal/business-in-lockdown-without-a-lockdown-20220106-p59mal (accessed 29 March 2022).

47 Sim, T. (2020) Two more Victorian meat plants close over COVID-19. *Beef Central*, 20 July 2020. Available: www.beefcentral.com/news/two-more-victorian-meat-plans-close-over-covid-19/ (accessed 29 March 2022).

48 Moolchand, E. and Marshall, S. (2022) Where's the meat? Employers and governments should have seen this supply crisis coming and done something. *The Conversation*, 24 January 2022.

49 Murphy, M., Carey, R. and Alexandra, L. (2022) As above.

50 AUSVEG (2022) Growers continue to feel price squeeze. *AUSVEG Advocacy Update* 18 Feb 2022. Available: https://ausveg.com.au/articles/growers-continue-to-feel-price-squeeze (accessed 20 April 2022).

51 Joint Standing Committee on Foreign Affairs, Defence and Trade (2017) *Hidden in Plain Sight: An inquiry into establishing a Modern Slavery Act in Australia.* Commonwealth of Australia.

52 Hughes, N., Lu, M., Soh, W. and Lawson, K. (2020) *Simulating the effects of climate change on the profitability of Australian farms*. ABARES working paper, Canberra, Australia.

53 Gluyas, A. (2021) Inflationary pressures bite as input, labour costs climb. *Australian Financial Review* 9 November 2021. Available: https://www.afr.com/markets/equity-markets/inflationary-pressures-bite-as-input-labour-costs-climb-20211109-p5977c (accessed 20 April 2022).

54 Kruger, C. (2022) Freight groups introduce Omicron surcharge to cover rising staff costs, *Sydney Morning Herald* 19 January 2022. Available: www.smh.com.au/business/companies/freight-groups-introduce-omicron-surcharge-to-cover-rising-staff-costs-20220118-p59p5v.html (accessed 20 April 2022).

55 Carey, R., Larsen, K. and Sheridan, J. (2019) *Roadmap for a resilient and sustainable Melbourne foodbowl*. University of Melbourne, Australia. doi.10.26188/5c92e85dd6edf.

Precarious employment affects the livelihoods of workers throughout the food system. Industries from production, processing and distribution, through to retail and hospitality have a high degree of casualised labour, low rates of pay, insecure jobs and poor working conditions.[56,57] More than half of the seasonal harvesting workforce in horticulture are temporary migrant workers and piece-rates are common, which leaves them vulnerable to exploitation.[58] In the food service sector, almost two-thirds are of workers are casually employed[59], work is often underpaid and frequently breaches labour regulations.[60]

Precarious employment affects the livelihoods of workers throughout the food system

2.5 Impacts of climate change on food production

Melbourne is in a warming and drying region[61], and climate change is already having an impact on food production. Average farm profitability in Victoria is estimated to have fallen around 37% between 2000 and 2020 due to the impacts of climate change.[62] Climate change has systemic impacts across all facets of agricultural production, affecting the timing of planting and harvests, pest and disease outbreaks, crop yields and quality, and the well-being and productivity of livestock.[63] Extreme weather events associated with climate change, such as droughts, fires, storms and floods can have significant impacts on production. The 2019-2020 bushfires burnt around 22% of farmland in the fire-affected areas of Victoria and caused around $325m damage on Victorian farms.[64]

The impacts of climate change on food production in the Melbourne region are likely to increase in future. The region will experience more extreme heat and rainfall is likely to decline.[65] One of the main ways that climate change will affect food production in the region is through lack of water[66], and this is likely to reduce crop yields. The Millennium Drought from 1996-2010 reduced crop yields in the Murray-Darling Basin by around 20%.[67] Further declines in the yields of key crops are expected by 2030.[68]

In addition to the impacts of climate change on food production, food production also drives climate change. In 2019, the agriculture sector in Victoria accounted for around 17% of the state's greenhouse gas (GHG) emissions.[69] Around 70% of emissions from Victoria's agriculture sector were due to livestock, particularly beef and dairy cattle.[70] Better management of grazing land using regenerative practices has potential to contribute to both climate mitigation and adaptation in the livestock sector (see section 3.3).[71]

56 Fair Work Commission (2021) *Decision – Application to vary the Horticulture Award 2021*, AM2020/104. Commonwealth of Australia.

57 DEDJTR (2016). *Victorian Inquiry into the Labour Hire Industry and Insecure Work – Final Report*. Department of Economic Development, Jobs, Transport & Resources. Melbourne, Australia

58 Fair Work Commission (2021) As above.

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61 Clarke J., Grose, M., Thatcher, M., Round, V. and Heady, C. (2019) *Greater Melbourne Climate Projections 2019*. CSIRO, Melbourne, Australia.

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63 Victorian Government (2022) *Primary production climate change adaptation action plan 2022-2026*. Department of Jobs, Precincts and Regions, Melbourne, Australia.

64 Bushfire Recovery Victoria (2020) *Eastern Victorian Fires 2019–20 State Recovery Plan*. Melbourne, Australia.

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66 Climate Council (2015) *Feeding a hungry nation: climate change, food and farming in Australia*. Climate Council of Australia. Sydney, Australia.

67 Steffan, W., Mallon, K., Kompass, T., Dean, A. and Rice, M. (2019) *Compound Costs: How climate change is damaging Australia's economy*. Climate Council of Australia. Sydney, Australia.

68 Climate Council (2015) As above.

69 DELWP (2022) *Victoria's greenhouse gas emissions and targets*. Department of Environment, Land, Water and Planning. Victorian State Government. Available: https://www.climatechange.vic.gov.au/victorias-greenhouse-gas-emissions-and-targets (accessed 31 March 2022).

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71 IPCC (2019) Summary for Policymakers. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)].

2.6 Environmental impacts of food production

The long-term resilience of Melbourne's food system is undermined by the impacts of agriculture on the environment. Food production depends on the availability of natural resources, such as land and water and on services provided by natural ecosystems, such as pollination, biological pest control, maintenance of soil fertility and cycling of nutrients, such as phosphorous and nitrogen.[72] Since colonisation, intensive approaches to agriculture that are ill-suited to Australia's ancient soils have undermined the ecosystems and natural resource base on which future food production depends.[73]

The long-term resilience of Melbourne's food system is undermined by the impacts of agriculture on the environment

Almost half of the land in Victoria is used for agriculture, most of it for grazing.[74] There is a lack of data about land degradation in Victoria, but around 37% of land used in Victoria for dryland (non-irrigated) agriculture is estimated to be at risk of soil erosion.[75] Soil erosion leads to loss of topsoil and a key cause is clearing of vegetation and overgrazing. Around 29% of Victoria's soils are estimated to be affected by acidification. Acidification of soils reduces crop productivity and increases soil erosion, and the causes include excess use of nitrogen-based fertilisers and removal of vegetation.[76]

Clearing of land for agriculture has had significant impacts on biodiversity in Victoria.[77] Victoria has experienced more land clearing than any other state in Australia[78], and has the highest number of threatened species in Australia.[79] Agriculture is the largest water user in Victoria[80], and over-extraction of water for agriculture can degrade river systems. Excess nutrients can also leach into waterways due to over-use of fertilisers, causing algal blooms.[81] Rising demand for food due to population growth is likely to put increasing pressure on natural resource use and ecosystems in Victoria[82], and there is a need to shift to more sustainable approaches to agriculture that work with and restore natural ecosystems (see section 3.3).

72 Power, A. (2010) Ecosystem services and agriculture: Tradeoffs and synergies. Philosophical Transactions of the Royal Society B 365: 2959-2971.

73 Iles, A. (2020) Can Australia transition to an agroecological future? *Agroecology and Sustainable Food Systems* 45(1): 3-41. DOI 10.1080/21683565.2020.1780537

74 Commissioner for Environmental Sustainability Victoria (CES) (2018) *Scientific assessments part III: Biodiversity*. Melbourne: Commissioner for Environmental Sustainability Victoria.

75 CES (2018) As above.

76 Agriculture Victoria (2020) *Soil acidity*. Available: https://agriculture.vic.gov.au/farm-management/soil/soil-acidity (accessed 30 March 2022).

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78 Deloitte Access Economics (2018) *Megatrends and the Victorian Environment: A report for the Victorian Commissioner for Environmental Sustainability*. November 2018. Melbourne: Deloitte Access Economics.

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80 Deloitte Access Economics (2018) As above.

81 Department of Primary Industries and Regional Development (2021) *Environmental impact of nitrogen and phosphorous fertilisers in high rainfall areas of Western Australia*. Available: https://www.agric.wa.gov.au/high-rainfall-pastures/environmental-impact-nitrogen-and-phosphorus-fertilisers-high-rainfall-areas (accessed 26 April 2022).

82 Deloitte Access Economics (2018) As above.

2.7 High levels of food waste

High levels of food waste undermine the resilience of Melbourne's food system and the city's food security. Over 200 kilograms of food waste was generated per person per year in 2016 in feeding Melbourne. Around 40% of this waste is generated in households, restaurants and cafes. Around 60% is generated at earlier stages of the food supply chain.[83]

Food waste can increase during supply chain disruptions due to shocks and stresses. The impact of the COVID-19 pandemic on Melbourne's food waste is unclear. However, early in the pandemic some Victorian farmers had to plough in crops when they lost their markets due to the closure of the hospitality sector.[84] Later in the pandemic during the Omicron wave, some farmers again had to plough in unharvested crops because of labour shortages on farm or in supermarket distribution centres.[85] The 2019-2020 bushfires in eastern Victoria and New South Wales also led to increased waste due to supply chain disruption[86], and crops and food supplies were destroyed during extensive flooding on the east coast in 2022.[87]

High levels of food waste undermine the resilience of Melbourne's food system

Food waste sent to landfill generates methane gas, a powerful GHG, as it decomposes. Food waste is also a waste of all the natural resources used to produce food, including land, water, fossil fuels and phosphorous (a key element of fertilisers derived from phosphate rock, a non-renewable resource). These natural resources are now limited in supply.[88] Victoria has a goal to halve food waste in the state by 2030 in line with Australia's National Food Waste Strategy and the Sustainable Development Goal target to halve food waste.[89] The priority in these strategies is to prevent food waste from being generated. Where food waste can't be prevented, it can be rescued and redistributed if fit for human consumption, re used as animal feed or recycled as part of a circular food economy to produce compost that can be used on Melbourne's farms. Composting captures important nutrients (such as phosphorous and nitrogen) so they are not lost from the food system (see section 3.5).

83 Sheridan, J., Carey, R. and Candy, S. (2016) *Melbourne's Foodprint: What does it take to feed a city?* Victorian Eco-Innovation Lab, The University of Melbourne.

84 Hope, Z. (2020) Farmers ploughing fresh veggies back into soil as restaurant ban bites. *The Age*, 25 April 2020. Available: https://www.theage.com.au/national/victoria/farmers-ploughing-fresh-veggies-back-into-soil-as-restaurant-ban-bites-20200424-p54n0q.html (accessed 13 April 2022).

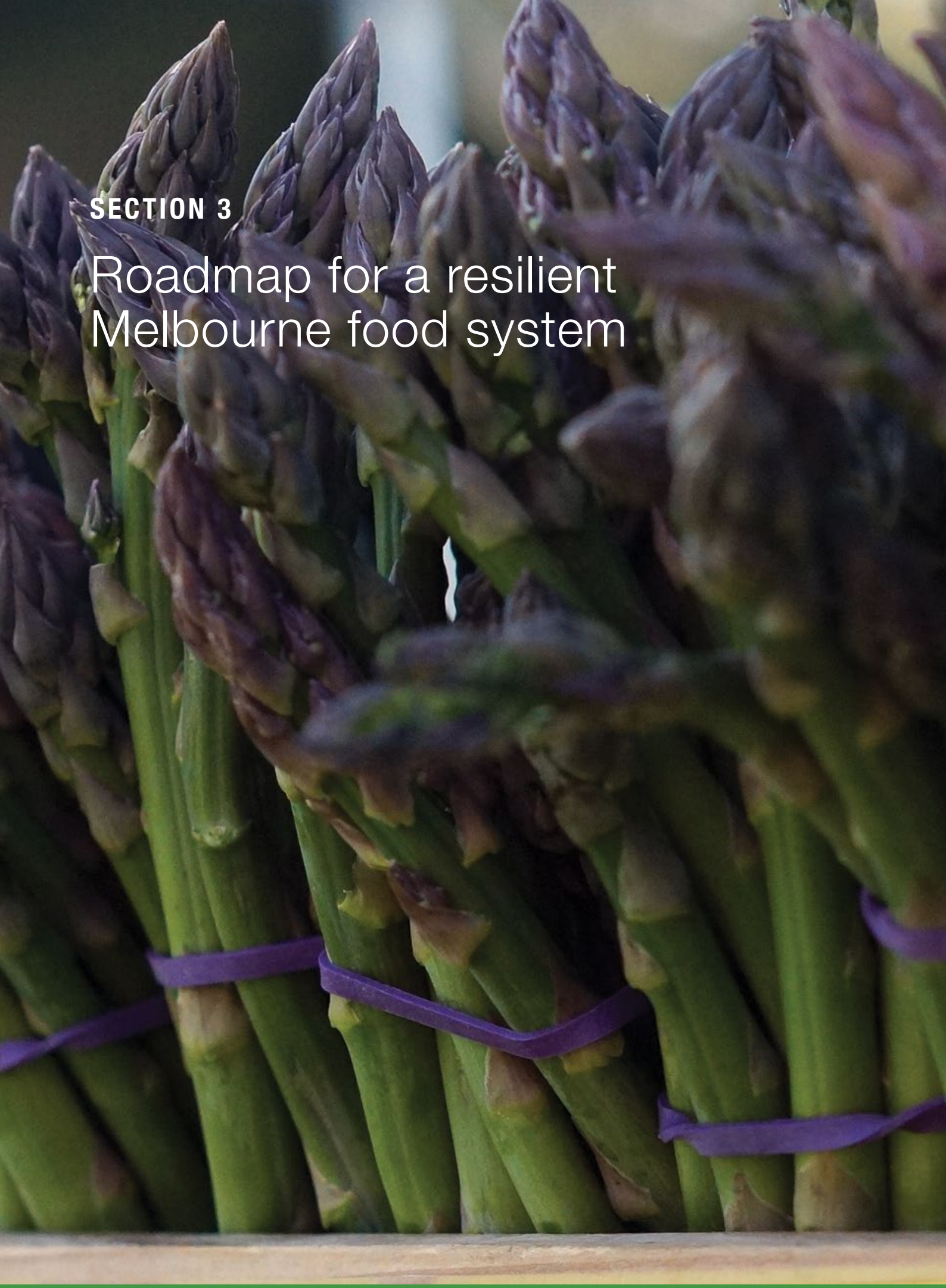
85 Cook, H. (2022) 'It's obscene': Farmers dump produce as supply chain crisis bites. *The Age*, 12 January 2022. Available: https://www.theage.com.au/national/victoria/it-s-obscene-farmers-dump-produce-as-supply-chain-crisis-bites-20220112-p59nln.html (accessed 31 March 2022).

86 Bishop, J., Bell, T., Huang, C. and Ward, M. (2021) *Fire on The Farm. Assessing the impacts of the 2019-2020 bushfires on food and agriculture in Australia*. Sydney, Australia.

87 Carey, R., Murphy, M. and Alexandra, L. (2022) As above.

88 Wunderlich, S. and Martinez, N. (2018) Conserving natural resources through food loss reduction: Production and consumption stages of the food supply chain. *International Soil and Water Conservation Research* 6 (4): 331-339.

89 Sustainability Victoria (2020) *The Path to Half: Solutions to halve Victoria's food waste by 2030*. Melbourne, Australia.



SECTION 3

Roadmap for a resilient Melbourne food system

3.1 An opportunity for transformation

3.1.1. Introduction

Shocks and stresses – such as COVID-19 and the 2019-2020 bushfires – reveal vulnerabilities in food systems. However, they also offer an opportunity to address the vulnerabilities to strengthen food system resilience to future shocks. Some shocks are so far-reaching in the way that they disrupt our lives that they create moments with the potential for more significant transformation.[90] The COVID-19 pandemic is one of these moments.

If the opportunity for food system transformation is to be harnessed effectively, it will require an integrated 'food systems' approach to promoting resilient, equitable, healthy and sustainable food systems.[91] The recommendations in this section focus on actions that can be taken by government, industry and civil society organisations to strengthen the resilience of Melbourne's city region food system to future shocks and stresses. The recommendations were developed through a 'co-design' process that involved a wide range of stakeholders (see section 1.4). Recommendations aimed at government take a 'whole of government' approach, recognizing that many policy portfolios influence the resilience of the food system.

Sustainable Development Goals

Increasing the resilience of Melbourne's food system through the recommendations presented in this roadmap will also support achieving many of the 17 UN Sustainable Development Goals (SDGs)[92]

- The *Overarching recommendations* contribute to the ten SDGs in Table 1, and all recommendations support SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- *Equitable access to nutritious food* contributes to SDG 1: End poverty in all its forms everywhere, SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture, and SDG3: Ensure healthy lives and promote well-being for all at all ages.
- *Regenerative and agroecological production systems* supports SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture, SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, SDG 6: Ensure availability and sustainable management of water and sanitation for all, SDG 12: Ensure sustainable consumption and production patterns, SDG 13: Take urgent action to combat climate change and its impacts, and SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
- *Protected closed-loop and urban agriculture* support SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture, SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, SDG 12: Ensure sustainable consumption and production patterns and SDG 13: Take urgent action to combat climate change and its impacts.
- *Circular food economies* supports SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture, SDG 6: Ensure availability and sustainable management of water and sanitation for all, SDG 12: Ensure sustainable consumption and production patterns, SDG 13: Take urgent action to combat climate change and its impacts, and SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

90 Blay-Palmer, A., Carey, R., Valette, E. and Sanderson, M. (2020) Post COVID 19 and pathways to sustainable transformation. *Agriculture and Human Values* 37 (3): 517-519.

91 Blay-Palmer, A., Carey, R., Valette, E. and Sanderson, M. (2020) As above.

92 See https://sdgs.un.org/goals

- *Local and regional food supply chains* contributes to SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture, SDG3: Ensure healthy lives and promote well-being for all at all ages, SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable, and SDG 12: Ensure sustainable consumption and production patterns.
- *Sustainable livelihoods* in food and agriculture supports SDG 1: End poverty in all its forms everywhere, SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture, SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, and SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable.

Table 1 Recommendations for a resilient food system

	Overarching
1.1	Develop a Victorian food resilience plan
1.2	Build stakeholder and community networks to promote food system resilience
1.3	Build food literacy and empower Victorians to shape the food system
1.4	Strengthen protection for Melbourne's peri-urban agricultural land
	Equitable access to nutritious food
2.1	Establish clear government responsibility in Victoria for ensuring the food security of citizens
2.2	Legislate the Right to Food and embed it in all relevant policy frameworks
2.3	Address the underlying causes of food insecurity by providing adequate income support and social protection
2.4	Establish an integrated measurement and monitoring framework to assess food insecurity across Victoria
2.5	Establish a Victorian 'peak body' to co-ordinate food relief
	Regenerative and agroecological production systems
3.1	Support farming communities to co-develop regional plans for sustainable production systems that generate net zero emissions
3.2	Support regenerative and agroecological farming approaches through state and local government agriculture policy
3.3	Establish outcome-based metrics and benchmarks for sustainable agricultural land management, including regenerative and agroecological farming systems
3.4	Incentivise farmers to adopt sustainable farming practices by paying them to provide ecosystem services and by providing loans and direct investment
3.5	Provide learning opportunities to support farmers in adopting regenerative and agroecological practices and build the evidence base for these approaches
3.6	Support Victorian Traditional Owners to recover and apply knowledge and practices of traditional food production


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
6 CLEAN WATER AND SANITATION
8 DECENT WORK AND ECONOMIC GROWTH
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
15 LIFE ON LAND

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Protected closed-loop and urban agriculture	
4.1	Review barriers to the development of protected closed-loop and urban agriculture.
4.2	Invest in protected closed-loop agriculture through new funding mechanisms and tax incentives
4.3	Establish training pathways in protected closed-loop and urban agriculture to create a skilled local workforce
4.4	Develop urban planning guidelines and templates for protected closed-loop and urban agriculture
Circular food economies	
5.1	Develop integrated policy and regulatory frameworks to promote a circular food economy
5.2	Develop integrated assessment frameworks for costing the delivery and benefits of recycled water for agriculture
5.3	Investigate options for better matching the quality of water needed for different types of agriculture and crops as part of a 'fit-for-purpose' water framework
5.4	Implement strategies to prevent and reduce organic waste across the food supply chain
5.5	Improve uptake and use of organic inputs in agriculture
Local and regional food supply chains	
6.1	Invest in local food processing and distribution
6.2	Review regulatory barriers to small-scale and artisanal food processing and distribution
6.3	Promote resilient local and regional food supply chains through planning and agriculture policy
6.4	Support the development of decentralised logistics and marketing systems
6.5	Introduce provenance labelling to promote local and regional food products
6.6	Strengthen government food procurement standards to give preference to Victorian produce and to pay farmers a fair price
Sustainable livelihoods	
7.1	Promote compliance with fair and safe work conditions and provide a living wage for workers throughout the food system
7.2	Provide diverse career and training pathways in the food and agriculture industries
7.3	Support the growth and development of a regional agricultural workforce through housing provision
7.4	Support new and aspiring farmers to access land, training and capital

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	6 CLEAN WATER AND SANITATION	8 DECENT WORK AND ECONOMIC GROWTH	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	15 LIFE ON LAND
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3.1.2. What should policy aim to achieve?

This narrative describes the overarching outcomes that policy should aim to achieve by 2050. It was developed through a series of co-design workshops with stakeholders from government, industry and civil society organisations (see section 1.4). The narrative is based on current projections about the impacts of climate change on the region (see section 2.5).

In 2050, Melbourne's population is living with the impacts of a warming climate. While climate mitigation efforts ramped up over the preceding decades, the food system is under constant strain from shocks and stresses. However, the city's food supply is proving resilient. Everyone enjoys dignified access to nutritious and culturally appropriate food. During the 2020s and 30s, stakeholders collaborated to transform Melbourne's city region food system, so that sustainable and healthy food is accessible to everyone. Government legislated to strengthen protection for agricultural land in Melbourne's city region and invested in increasing the diversity of food supply chains. Communities mobilised to strengthen the resilience of the city's food supply. Melbournians have increased their consumption of locally produced, seasonal foods and Melbourne has a thriving food culture. Foods produced by Victoria's First Nations peoples are also an important part of the region's sustainable and resilient food supply.

Farmers use a diverse range of sustainable farming approaches. They have adapted to the impacts of climate change and farming practices emphasise regeneration of natural ecosystems and carbon sequestration. Farmers are rewarded for the ecosystem services that they provide. Agriculture policy at all levels of government promotes approaches to sustainable farming, including regenerative agriculture and agroecology. First Nations peoples have secure access to land to produce food on Country, and new farmers also have a range of opportunities to access land.

Recycled water, stormwater and organic waste resources are safely re-used on farms in Melbourne's city region. Small to medium sized farmers and food enterprises collectively manage regional and local supply chains that have strong connections to consumers. Workers throughout the food supply chain have secure and fair working conditions, and excellent training and employment pathways.

3.1.3. Overarching recommendations

1 Develop a Victorian food resilience plan

What

Develop a 'whole of government' food resilience plan for Victoria to increase the resilience of the state's food systems to shocks and stresses. The plan should be fully funded and should identify strategic priorities and actions across government, industry, health and civil society organisations. It would set targets for long-term food security, and guide investment and decision making.

a. **Embed Indigenous self-determination and food sovereignty** at the centre of Victoria's food resilience plan (see recommendation 6 in section 3.3).

b. Include a **roadmap to end food insecurity** in Victoria in the State's food resilience plan (see recommendation 1 in section 3.2).

c. **Establish a 'whole of government' governance framework** for the Victorian food resilience plan. Development of the plan should include all relevant state government departments. The plan should also identify the lead government agency with overarching responsibility for food system resilience. The plan should be developed in collaboration with First Nations organisations, civil society, industry, local government, federal government, peak health bodies and other food system organisations.

d. Support **Victorian local governments** in food resilience planning, as part of the **municipal public health and wellbeing planning process.**

Who

Victorian government, local government, industry, civil society organisations, peak health bodies federal government

Why

Recent climate and pandemic shocks have exposed vulnerabilities in food systems and resulted in rising food insecurity.[93] Food system resilience requires action across multiple departments and levels of government, in collaboration with industry and civil society organisations. Development of a food resilience plan should bring together multiple policy portfolios including land use, agriculture, water, climate change, recycling, public health, emergency management, tourism and economic policy. However, to ensure effective governance, a single agency and Minister should have overall accountability for food system resilience.

2 Build stakeholder and community networks to promote food system resilience

What

Build strong networks and partnerships between government, industry and civil society organisations in the food system to promote intersectoral action and collaboration.

a. **Establish a food system network for the Melbourne city region** that brings together stakeholders across the food system. The food policy collaboration would provide a forum to improve the regional food system. It could leverage existing coordinating platforms, such as the Victorian Healthy Eating Enterprise.[94]

b. **Provide financial support to mutual aid groups and other community organisations.** These groups work within local communities and play a critical role in supporting access to nutritious and culturally appropriate food during shocks to the food system, such as bushfire, floods and pandemic.[95]

Who

Government, industry and civil society organisations

Why

Networks of food system stakeholders can foster trust and align efforts to achieve change. In North America, there is a 40-year tradition of food policy councils that bring stakeholders together to improve the food system.[96] Many other countries have adopted similar coordinating platforms at city or regional level. The first metropolitan-wide food governance group in Melbourne, the Melbourne Food Alliance, was established in 2019.[97] However, this group is currently inactive, and a new mechanism is needed to support effective food system governance across Melbourne's city region. Horizontal collaboration between sectors, and vertical collaboration between levels of government can also strengthen food system resilience.[98,99]

93 Carey, R., Murphy, M., & Alexandra, L. (2020) COVID-19 highlights the need to plan for healthy, equitable and resilient food systems. *Cities & Health*, 1-4. doi:10.1080/23748834.2020.1791442.

94 See www.health.vic.gov.au/preventive-health/the-victorian-healthy-eating-enterprise

95 Fernandes-Jesus, M., Mao, G., Ntontis, E., Cocking, C., McTague, M., Schwarz, A., Semlyen, J. and Drury, J. (2021) More Than a COVID-19 Response: Sustaining Mutual Aid Groups During and Beyond the Pandemic. *Front Psychol* 12: 716202.

96 Halliday, J., Torres, C. and van Veenhuizen, R. (2019) Food Policy Councils: Lessons on inclusiveness. *Urban Agriculture Magazine*. RUAF Global Partnership on Sustainable Urban Agriculture and Food Systems.

97 See www.melbourne.vic.gov.au/community/health-support-services/health-services/Pages/melbourne-food-alliance.aspx

98 Marusak, A., Sadeghiamirshahidi, N., Krejci, C., Mittal, A., Beckwith, S., Cantu, J., Morris, M. and Grimm, J. (2021) Resilient regional food supply chains and rethinking the way forward: Key takeaways from the COVID-19 pandemic. *Agricultural Systems* 190: 103101.

99 Dubbeling, M., Santini, G., Renting, H., Taguchi, M., Lancon, L., Zuluaga, J., de Paoli, L., Rodriguez, A. and Andino, V. (2017) Assessing and Planning Sustainable City Region Food Systems: Insights from Two Latin American Cities. *Sustainability* 9 (8): 1455.

3 Build food literacy and empower Victorians to shape the food system

What

Build a more resilient, healthy, sustainable and equitable food system by empowering citizens to develop solutions and lead change.

a. **Increase food literacy** in the community by providing opportunities to learn about food growing and preparation through school programs, volunteering opportunities, farm visits and urban agriculture.

b. **Build the capacity** of civil society and community organisations to strengthen local food systems by providing funding and training, and by facilitating connections between organisations.

Who

Local governments, state government, industry groups, civil society and philanthropic groups

Why

Local communities should have a range of opportunities to increase their knowledge and participate in shaping the local food system. Community education and learning about the food system - from production to waste recycling - can help to build food system resilience.

4 Strengthen protection for Melbourne's peri-urban agricultural land

What

Strengthen protection for all farmland in Melbourne's peri-urban area to address challenges to the city's food supply from population growth, climate change and pandemic shocks.

a. **Maintain Melbourne's current Urban Growth Boundary** (UGB) as a firm boundary that is not subject to reviews or expansion. A new 'food production zone' should also be applied to all farmland in Melbourne's peri-urban area.[100]

b. **Promote active farming** of farmland in Melbourne's foodbowl. Policy measures to protect agricultural land must be accompanied by mechanisms to promote the viability of farming in the region.[101]

Who

State government, local governments

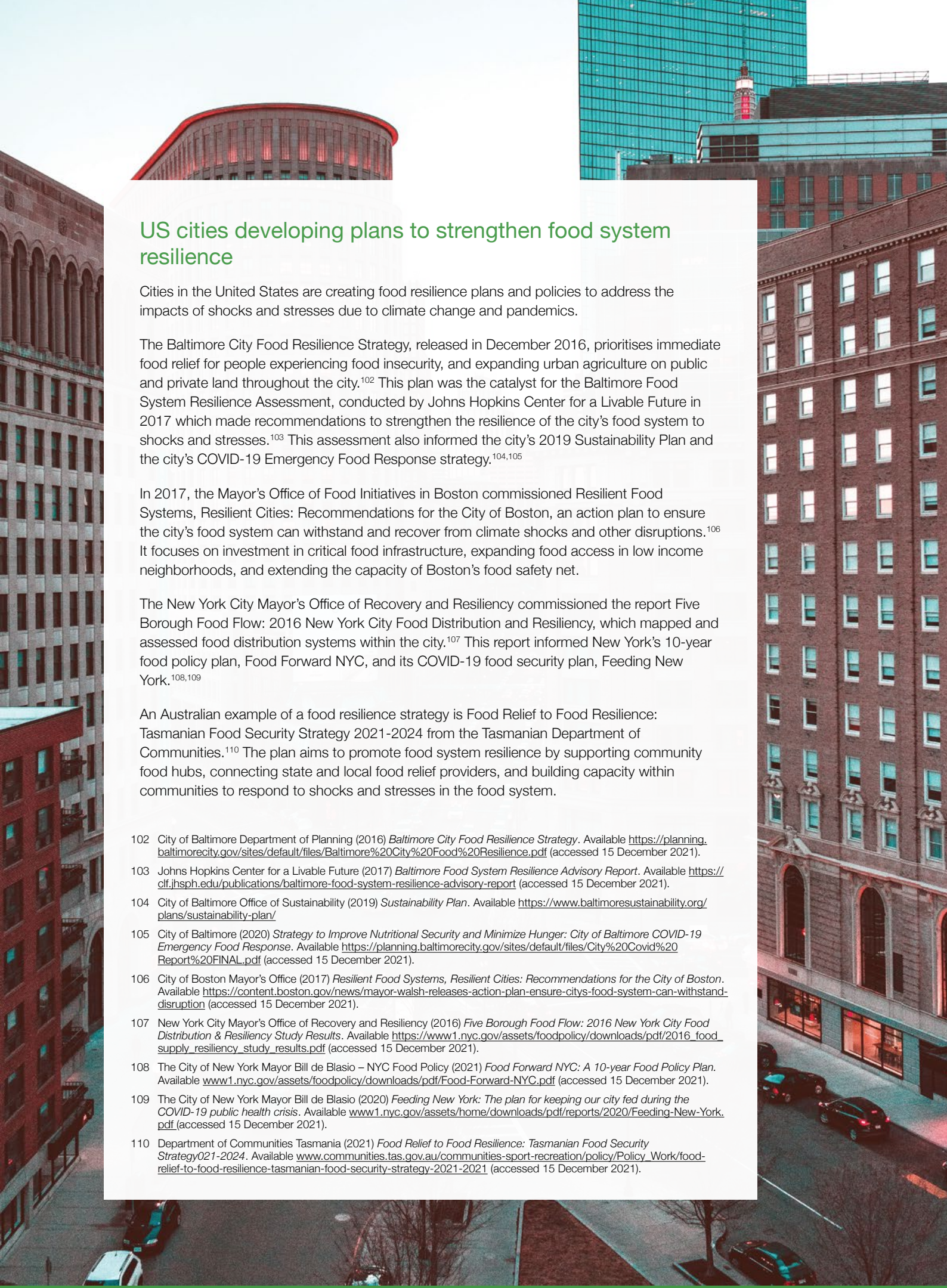
Why

Local and regional food production is key to ensuring Victoria's long-term food security and will support recovery from pandemic and climate shocks. Policy to permanently protect farmland in Melbourne's foodbowl and to promote the viability of farming in the region is a fundamental building block in a more resilient food system.

Right: unsplash.com/Alex Iby

100 For detailed recommendations, see Carey, R., Larsen, K. and Sheridan, J. (2019) *Roadmap for a resilient and sustainable Melbourne foodbowl*. University of Melbourne, Australia. doi.10.26188/5c92e85dd6edf

101 Carey, R., Larsen, K. and Sheridan, J. (2019) As above.



US cities developing plans to strengthen food system resilience

Cities in the United States are creating food resilience plans and policies to address the impacts of shocks and stresses due to climate change and pandemics.

The Baltimore City Food Resilience Strategy, released in December 2016, prioritises immediate food relief for people experiencing food insecurity, and expanding urban agriculture on public and private land throughout the city.[102] This plan was the catalyst for the Baltimore Food System Resilience Assessment, conducted by Johns Hopkins Center for a Livable Future in 2017 which made recommendations to strengthen the resilience of the city's food system to shocks and stresses.[103] This assessment also informed the city's 2019 Sustainability Plan and the city's COVID-19 Emergency Food Response strategy.[104,105]

In 2017, the Mayor's Office of Food Initiatives in Boston commissioned Resilient Food Systems, Resilient Cities: Recommendations for the City of Boston, an action plan to ensure the city's food system can withstand and recover from climate shocks and other disruptions.[106] It focuses on investment in critical food infrastructure, expanding food access in low income neighborhoods, and extending the capacity of Boston's food safety net.

The New York City Mayor's Office of Recovery and Resiliency commissioned the report Five Borough Food Flow: 2016 New York City Food Distribution and Resiliency, which mapped and assessed food distribution systems within the city.[107] This report informed New York's 10-year food policy plan, Food Forward NYC, and its COVID-19 food security plan, Feeding New York.[108,109]

An Australian example of a food resilience strategy is Food Relief to Food Resilience: Tasmanian Food Security Strategy 2021-2024 from the Tasmanian Department of Communities.[110] The plan aims to promote food system resilience by supporting community food hubs, connecting state and local food relief providers, and building capacity within communities to respond to shocks and stresses in the food system.

102 City of Baltimore Department of Planning (2016) *Baltimore City Food Resilience Strategy*. Available https://planning.baltimorecity.gov/sites/default/files/Baltimore%20City%20Food%20Resilience.pdf (accessed 15 December 2021).

103 Johns Hopkins Center for a Livable Future (2017) *Baltimore Food System Resilience Advisory Report*. Available https://clf.jhsph.edu/publications/baltimore-food-system-resilience-advisory-report (accessed 15 December 2021).

104 City of Baltimore Office of Sustainability (2019) *Sustainability Plan*. Available https://www.baltimoresustainability.org/plans/sustainability-plan/

105 City of Baltimore (2020) *Strategy to Improve Nutritional Security and Minimize Hunger: City of Baltimore COVID-19 Emergency Food Response*. Available https://planning.baltimorecity.gov/sites/default/files/City%20Covid%20Report%20FINAL.pdf (accessed 15 December 2021).

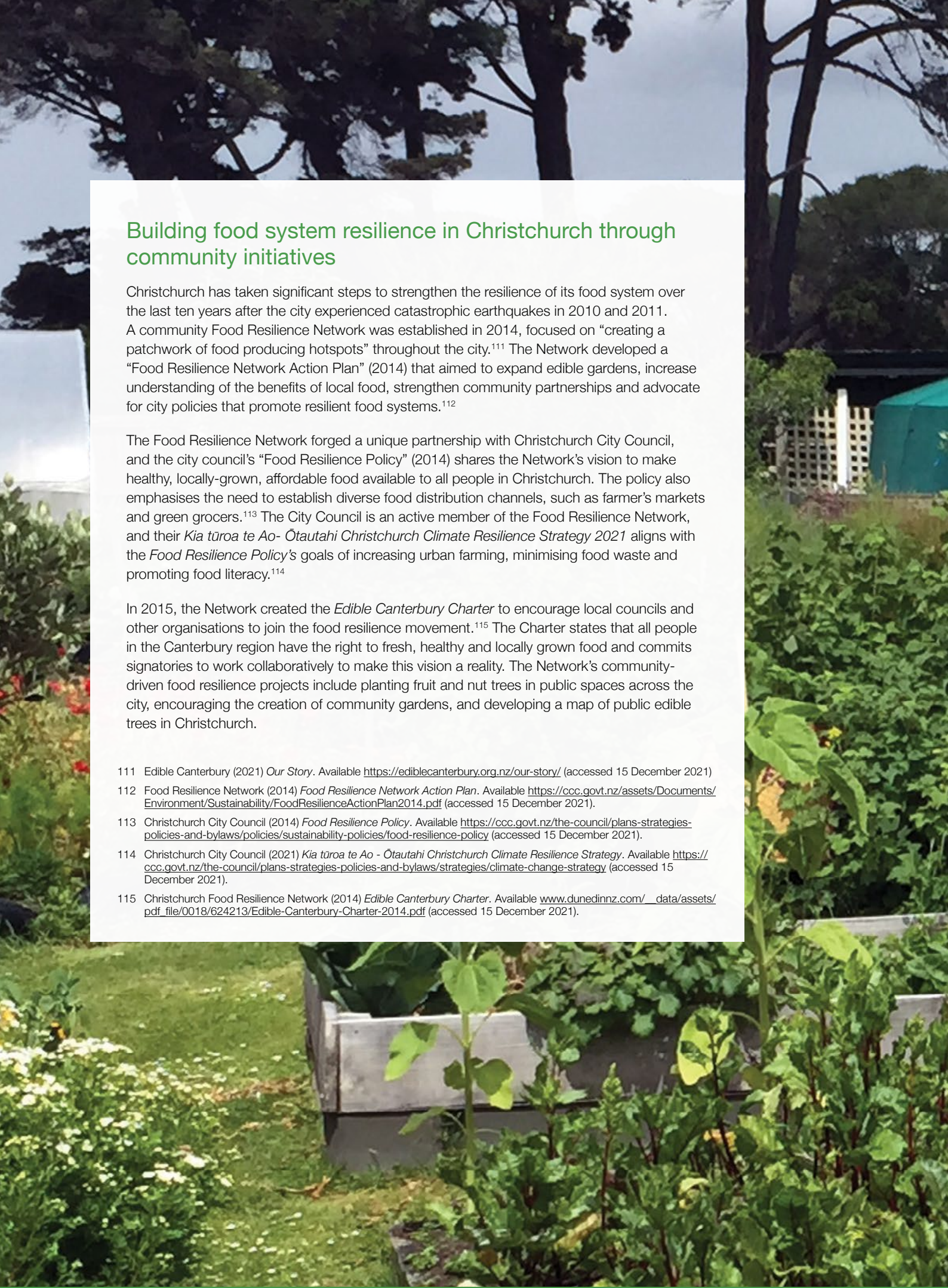
106 City of Boston Mayor's Office (2017) *Resilient Food Systems, Resilient Cities: Recommendations for the City of Boston*. Available https://content.boston.gov/news/mayor-walsh-releases-action-plan-ensure-citys-food-system-can-withstand-disruption (accessed 15 December 2021).

107 New York City Mayor's Office of Recovery and Resiliency (2016) *Five Borough Food Flow: 2016 New York City Food Distribution & Resiliency Study Results*. Available https://www1.nyc.gov/assets/foodpolicy/downloads/pdf/2016_food_supply_resiliency_study_results.pdf (accessed 15 December 2021).

108 The City of New York Mayor Bill de Blasio – NYC Food Policy (2021) *Food Forward NYC: A 10-year Food Policy Plan.* Available www1.nyc.gov/assets/foodpolicy/downloads/pdf/Food-Forward-NYC.pdf (accessed 15 December 2021).

109 The City of New York Mayor Bill de Blasio (2020) *Feeding New York: The plan for keeping our city fed during the COVID-19 public health crisis*. Available www1.nyc.gov/assets/home/downloads/pdf/reports/2020/Feeding-New-York.pdf (accessed 15 December 2021).

110 Department of Communities Tasmania (2021) *Food Relief to Food Resilience: Tasmanian Food Security Strategy021-2024*. Available www.communities.tas.gov.au/communities-sport-recreation/policy/Policy_Work/food-relief-to-food-resilience-tasmanian-food-security-strategy-2021-2021 (accessed 15 December 2021).



Building food system resilience in Christchurch through community initiatives

Christchurch has taken significant steps to strengthen the resilience of its food system over the last ten years after the city experienced catastrophic earthquakes in 2010 and 2011. A community Food Resilience Network was established in 2014, focused on "creating a patchwork of food producing hotspots" throughout the city.[111] The Network developed a "Food Resilience Network Action Plan" (2014) that aimed to expand edible gardens, increase understanding of the benefits of local food, strengthen community partnerships and advocate for city policies that promote resilient food systems.[112]

The Food Resilience Network forged a unique partnership with Christchurch City Council, and the city council's "Food Resilience Policy" (2014) shares the Network's vision to make healthy, locally-grown, affordable food available to all people in Christchurch. The policy also emphasises the need to establish diverse food distribution channels, such as farmer's markets and green grocers.[113] The City Council is an active member of the Food Resilience Network, and their *Kia tūroa te Ao- Ōtautahi Christchurch Climate Resilience Strategy 2021* aligns with the *Food Resilience Policy's* goals of increasing urban farming, minimising food waste and promoting food literacy.[114]

In 2015, the Network created the *Edible Canterbury Charter* to encourage local councils and other organisations to join the food resilience movement.[115] The Charter states that all people in the Canterbury region have the right to fresh, healthy and locally grown food and commits signatories to work collaboratively to make this vision a reality. The Network's community-driven food resilience projects include planting fruit and nut trees in public spaces across the city, encouraging the creation of community gardens, and developing a map of public edible trees in Christchurch.

111 Edible Canterbury (2021) *Our Story*. Available https://ediblecanterbury.org.nz/our-story/ (accessed 15 December 2021)

112 Food Resilience Network (2014) *Food Resilience Network Action Plan*. Available https://ccc.govt.nz/assets/Documents/Environment/Sustainability/FoodResilienceActionPlan2014.pdf (accessed 15 December 2021).

113 Christchurch City Council (2014) *Food Resilience Policy*. Available https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/policies/sustainability-policies/food-resilience-policy (accessed 15 December 2021).

114 Christchurch City Council (2021) *Kia tūroa te Ao - Ōtautahi Christchurch Climate Resilience Strategy*. Available https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/strategies/climate-change-strategy (accessed 15 December 2021).

115 Christchurch Food Resilience Network (2014) *Edible Canterbury Charter*. Available www.dunedinnz.com/__data/assets/pdf_file/0018/624213/Edible-Canterbury-Charter-2014.pdf (accessed 15 December 2021).

3.2 Equitable access to nutritious food

3.2.1. Introduction

The dominant approach to addressing food insecurity in Victoria and elsewhere in Australia is provision of emergency food relief by charitable organisations, using food donated by the food industry. Rising food insecurity during the COVID-19 pandemic highlighted the flaws in this model. As demand for emergency food relief rose, donations from the food industry slowed due to sudden spikes in consumer demand for food.[116] However, criticism of this system of food relief had been growing long before the pandemic. People who access food relief may experience shame and embarrassment, which can be a barrier to seeking help.[117] As food relief services rely mainly on donations of surplus food, the food provided is often highly processed, of low nutritional value and may be culturally inappropriate.[118] Food relief does not give people control over food provisioning in a way that meets their food preferences and does not ensure their human right to adequate food.[119]

The human right to food

The right to adequate food is a fundamental human right included in the Universal Declaration of Human Rights and outlined in the International Covenant on Economic, Social and Cultural Rights.[120] The right to food is "the right of every individual, alone or in community with others, to have physical and economic access at all times to sufficient, adequate and culturally acceptable food that is produced and consumed sustainably, preserving access to food for future generations".[121] Australia has ratified the International Covenant on Economic, Social and Cultural Rights. However, the right to food has not been legislated in Australia, so cannot be legally enforced.[122] The Right to Food Coalition advocates for a rights-based approach to addressing food insecurity in Australia.[123]

Food relief also fails to address the root causes of food insecurity, which relate to poverty.[124] During the height of the COVID-19 pandemic, the federal government doubled income support for unemployed people who received 'JobSeeker' benefits, which had a positive impact on their food security. The Victorian Council of Social Service advocates for a permanent increase in JobSeeker benefits.[125] There is a need greater government leadership in addressing the causes of food insecurity, and for clearer government accountability for ensuring that people can realise their human right to food.

116 Murphy, M. et al. (2022) *The resilience of Melbourne's food system to climate and pandemic shocks*. University of Melbourne, Australia.

117 Foodbank Australia (2020) *Foodbank hunger report 2020: Food insecurity in the time of COVID-19*. Sydney, Australia.

118 Lindberg, R., Whelan, J., Lawrence, M., Gold, L. and Friel, S. (2015) Still serving hot soup? Two hundred years of a charitable food sector in Australia: a narrative review. *Australian and New Zealand Journal of Public Health* 39 (4): 358-365.

119 Lindberg, R., Barbour, L. and Godrich, S. (2021) A rights-based approach to food security in Australia. *Health Promotion Journal of Australia* 32: 6-12.

120 HLPE (2020) As above.

121 De Schutter, O. 2014. *Final Report: The transformative potential of the right to food*. Presented to the 25th Session of the UN Human Rights Council, United Nations General Assembly.

122 Godrich, S., Barbour, L. and Lindberg, R. (2021) Problems, policy and politics – perspectives of public health leaders on food insecurity and human rights in Australia. *BMC Public Health* 21: 1132.

123 See https://righttofood.org.au/

124 Godrich, S. et al. (2021) As above.

125 Community Information & Support Victoria and Victorian Council of Social Service (2021) *More than a band-aid: Emergency Relief in Victoria*, Melbourne, Australia.

3.2.2. What should policy aim to achieve?

This narrative describes the outcomes that policy should aim to achieve by 2050:

In 2050, everyone has access to fresh, nutritious and culturally appropriate food. The numbers of people experiencing food insecurity are at a record low. Income support, social protection and affordable housing policies ensure that fewer people are food insecure. Those who do need to access food relief services can do so with dignity and choice, and without stigma. Everyone can access services and people feel welcome and valued.

In the 2020s, government, civil society and industry worked together with people experiencing hunger to transform Victoria's approach to addressing food insecurity. Robust systems of procurement, storage and distribution are in place to respond to increased demand for food following shocks and stresses. Staple food stockpiles and distribution capacity is available in communities in the event of a crisis, including a range of nutritious foods that meet dietary and cultural needs.

A well-resourced and networked system of the government, industry, community and volunteering sectors, engages communities and responds to local needs. All sectors and organisations understand the needs of vulnerable population groups and at-risk individuals. Services offer comprehensive support, responding to the complex economic, social and physical barriers to food access.

3.2.3. Recommendations

1 Establish clear government responsibility in Victoria for ensuring the food security of citizens

What

The Victorian Government should establish clear ministerial, state and local government responsibility for ensuring the food security of Victorians and eliminating food insecurity in the state.

a. Develop a roadmap for eliminating food insecurity in Victoria as part of an overarching food resilience plan (see section 3.1). The roadmap should identify priorities and actions across state and local government and civil society organisations. It should also discuss the role of the federal government in addressing the underlying drivers of food insecurity.

b. Address food insecurity through the Victorian public health and wellbeing plan and municipal public health and wellbeing plans, with a focus on equitable access to nutritious food.

c. Establish nutritional standards for food relief services across Victoria to ensure that community members are provided with healthy and culturally appropriate foods, including seasonal fruit and vegetables.

d. Establish community stockpiles and distribution plans across Victoria for non-perishable foods that can be drawn on in emergencies. Also encourage households to maintain an "emergency pantry list" of non-perishable staple foods.

e. Provide funding for community food security initiatives that are transformative and initiatives that scale up successful pilot programs. Initiatives funded should be designed with input from community members with lived experience of food insecurity.

Who

Victorian Government, local governments

Why

Victoria's system for addressing food insecurity currently relies on emergency food relief provided by the charitable sector. This ad hoc system does not meet the needs of Victorians for dignified ongoing access to nutritionally and culturally appropriate food. There is a need for government leadership to develop a new policy framework that covers a continuum of responses from emergency food relief to systemic action to ensure the long-term food security of citizens. It should build upon existing initiatives of the Food Relief Taskforce[126] and investments in community food relief.

2 Legislate the Right to Food and embed it in all relevant policy frameworks

What

Legislate the right to food in Victoria and embed recognition of the right to food as a fundamental human right into all relevant state and local government policy frameworks, including land use and public health and wellbeing policy. Advocate for federal government recognition of the right to food in national policy frameworks.

a. The Victorian Government should introduce a *Right to Food Act* in Victoria, which requires the responsible Minister to (i) set targets to eliminate food insecurity in the State (ii) report progress against these targets on a regular basis (iii) develop a strategy to eliminate food insecurity in the state and (iv) require each local government in Victoria to develop a food strategy that references the state government targets.

b. All local governments in Victoria should be required to develop a food strategy and action plan under the Act that recognises the right to food as a fundamental human right and identifies how the local government will progress targets to eliminate food insecurity. These local food strategies should be developed in collaboration with local communities, including community members with lived experience of food insecurity. The strategies should adopt a 'food systems' approach to achieving healthy, sustainable and resilient local food systems.

Who

Victorian Government and local governments in partnership with other food system stakeholders and their local communities.

Why

Australia is a signatory to the International Covenant on Economic, Social and Cultural Rights, which recognises the right to adequate food.[127] However, the right to food is not incorporated into national or state legal frameworks in Australia and is often unrecognised in relevant policy frameworks that promote food security. This means that the right to food cannot legally be enforced in Victoria and Australia and that relevant policy is not underpinned by recognition of the right to food. Recognising the right to food will provide the foundation for a resilient and equitable food system.

126 The Food Relief Taskforce was established by the Victorian Government in 2021 to provide strategic advice to government on strengthening and enhancing food relief activity in Victoria. See https://providers.dffh.vic.gov.au/food-relief-taskforce

127 Australian Government (2016) *Australia's fifth report under the International Covenant on Economic, Social and Cultural Rights* (ICESCR) 2010-2014. 1 February 2016. Canberra, Australia.

3 Address the underlying causes of food insecurity by providing adequate income support and social protection

What

Address the root causes of food insecurity in Victoria by alleviating poverty and disadvantage. This should include providing adequate levels of income support and extending financial support to vulnerable groups that are currently excluded, such as asylum seekers, refugees and international students.

a. Advocate for an increase in income support to enable equitable access to nutritious food. For example, permanently raise JobSeeker payments to at least $65 a day and index payments in line with wage increases, as recommended by the Victorian Council of Social Service.[128]

b. Establish specific targets to eliminate poverty and disadvantage in Victoria.

Who

Federal government (income support) and state government (targets to eliminate poverty and disadvantage)

Why

The root causes of food insecurity lie in poverty and disadvantage. It is these issues which need to be addressed to effectively tackle food insecurity. Adequate levels of income support enable people to access food in a socially acceptable way that meets their human right to food by giving them the choice to meet food needs according to their cultural and personal preferences. Other forms of charitable food relief based on emergency food aid carry stigma and shame for recipients and deny their human right to meet their own food needs in ways that meet their dietary needs and cultural preferences.

4 Establish an integrated measurement and monitoring framework to assess food insecurity across Victoria

What

A consistent state-wide data framework is required for regular monitoring of food insecurity across Victoria. Statewide monitoring of food insecurity at local government level is irregular and infrequent. The framework could draw on the WA Food Stress Index for measuring and monitoring food insecurity.[129] Collecting data from people with lived experience of food insecurity can guide policy and targeted effort.

a. Establish a state-wide data monitoring framework to provide timely and consistent information about rates of food insecurity across Victoria, and to identify geographic areas in need of food relief or at risk of food insecurity. Progress is being made towards this goal through the Victorian Food Relief Taskforce's initiatives to develop a Food Relief Dashboard and Victorian Food Stress Index.[130]

b. Investigate the lived experience of people in Victoria who experience food insecurity, with a focus on learning lessons from people's experience of food insecurity and provision of food relief during the COVID-19 pandemic and the 2019-2020 bushfires.

128 Community Information & Support Victoria and Victorian Council of Social Service (2021) As above.

129 Landrigan, T., Kerr, D., Dhaliwal, S. and Pollard, C. (2018) Protocol for the Development of a Food Stress Index to Identify Households Most at Risk of Food Insecurity in Western Australia. *Int J Environ Res Public Health* 16 (1):79.

130 Department of Families, Fairness and Housing (2021) *Food Relief Taskforce Action Plan*. Available https://providers.dffh.vic.gov.au/food-relief-taskforce-action-plan-word (accessed 19 December 2021).

Who

Victorian state government, organisations involved in providing food relief in Victoria

Why

Data about the prevalence of food insecurity at local government level in Victoria is delivered infrequently. This makes it difficult to plan effectively for delivery of services to address food insecurity. There is also little available data about the lived experience of community members who are food insecure in Victoria to inform improvements to delivery of food relief. It is important that a comprehensive and timely measurement and monitoring framework is implemented for food insecurity across the state.

5 Establish a Victorian 'peak body' to co-ordinate food relief

What

Establish an independent Victorian peak body for organisations involved in sourcing, distributing and managing food relief. The organisation would take an evidence-based approach and provide a platform for collaboration among stakeholders in the sector and with federal, state and local government. The peak body should identify ways to strengthen the volunteering infrastructure of the food relief sector.

Who

Foodbanks and other organisations that deliver food relief in collaboration with the Victorian Government

Why

The food relief sector in Victoria is currently fragmented and lacks co-ordination, which leads to challenges in delivering food relief effectively across the state. Establishing a peak body for food relief in the state would create a mechanism for more effective co-ordination and a platform for advocacy on issues of importance across the sector. There are also opportunities for greater collaboration across the sector e.g. through shared infrastructure and logistics.

3.2.4. Potential enablers and barriers to implementing the recommendations

Stakeholders identified a range of potential barriers and enablers to implementing these recommendations:

Enablers

- The 2019-2020 bushfires in Victoria and the COVID-19 pandemic have provided evidence of widespread food insecurity and a policy window of opportunity to act as communities rebuild and recover.
- There is an emerging international body of evidence and case studies that provide guidance on effective approaches to end food insecurity. The UN provides a definition and guidelines on establishing a right to food.
- There are policy co-benefits for action on climate change and action on food insecurity. Action to promote the availability of nutritious culturally-appropriate food for all also has public health co-benefits to prevent overweight and obesity
- A Food Relief Taskforce has been established by the Victorian State Government to strengthen food relief initiatives, and there is potential to enhance existing data collection and operating models.

Barriers

- The human right to food expressed in the International Covenant on Economic, Social and Cultural Rights is not enshrined in law at any level of government in Australia. There is little understanding of what the right to food means and legislating for the right to food would be a lengthy process.
- No specific level of government or government portfolio is accountable for ensuring the food security of citizens in Victoria, and there is no common understanding of what food insecurity means.
- The charitable sector currently plays the lead role in tackling food insecurity. While civil society organisations and the food industry should be engaged in partnership approaches, responsibility for ending food insecurity should be led by government. This requires strong leadership, political will and investment.
- Data collection about food insecurity across Australia is inconsistent. Data is not collected frequently enough at the local scale to enable targeted approaches in local areas or among vulnerable population groups.

Right: Image courtesy of Moving Feast

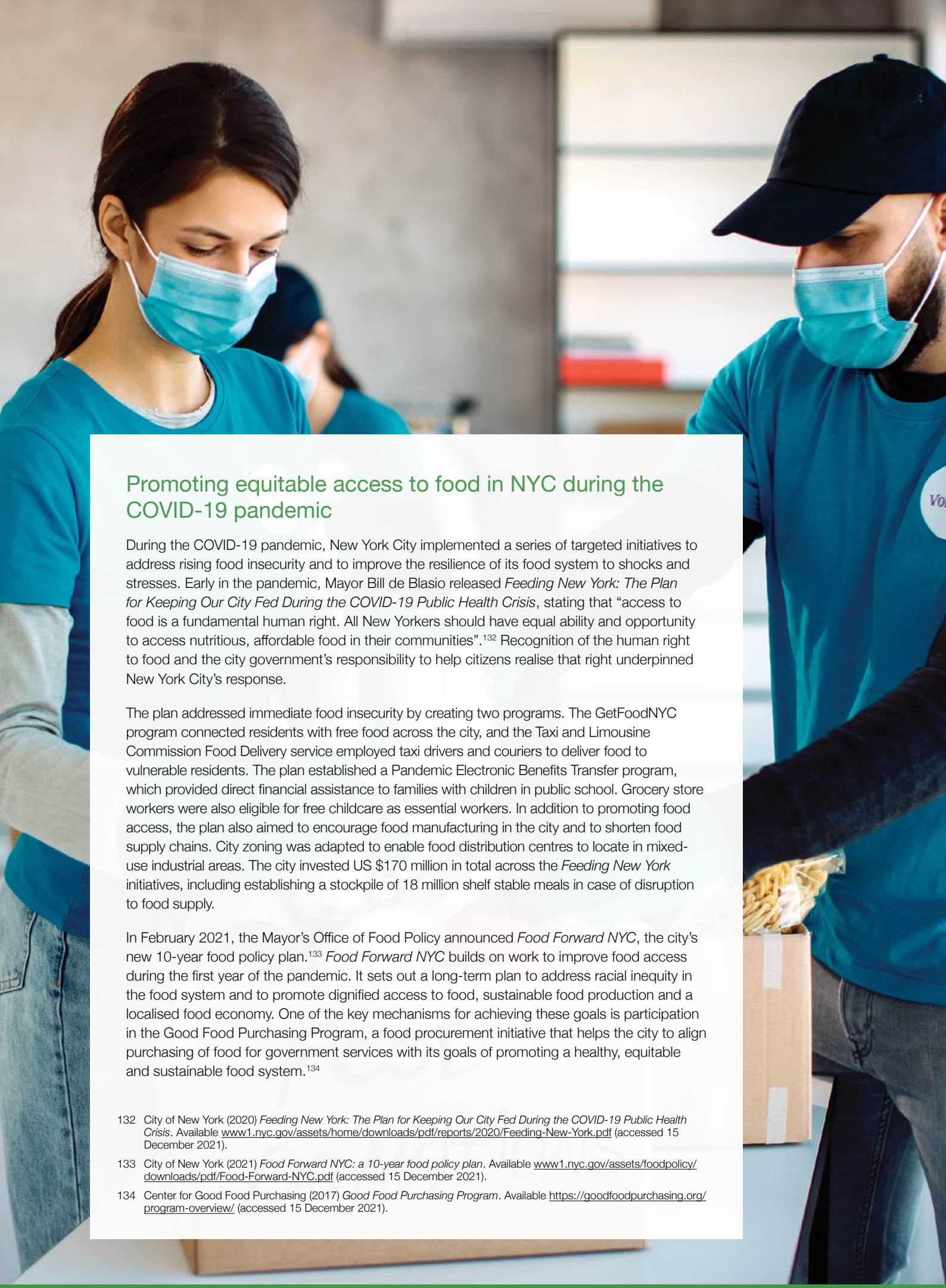
Moving Feast: Food relief that promotes an equitable and regenerative food system

Moving Feast is a collective of over 20 social enterprises working to create a fair and regenerative food system in Victoria. Core organisations involved in the project include STREAT, Melbourne Farmer's Markets, CERES, Cultivating Community, Collingwood Children's Farm, Open Food Network, Common Ground Project and The Community Grocer.

The group formed during the COVID-19 pandemic and initially focused on providing food relief by growing, cooking, and delivering culturally appropriate food to vulnerable Victorians.[131] Moving Feast has developed a holistic model of food relief, based on food sourced from local regenerative farmers and community enterprises. The group has also developed a decentralised, community-driven food distribution system. This system includes mass assembly and delivery of produce boxes and food growing kits, distribution of home cooking equipment and food preparation kits, and delivery of healthy and culturally appropriate food relief.

The group has moved beyond its initial food relief work into longer term food system recovery and regeneration. The collective now has over 15 projects underway across nine thematic areas, including food security, inclusive employment, food retail, and circular economy. The collective has also secured strong support from philanthropists, the state government, and the general public (through a crowd-funding campaign) and hopes to continue working together for many years to come.

131 Moving Feast (2020) About https://movingfeast.net/about-us (accessed 15 December 2021).



Promoting equitable access to food in NYC during the COVID-19 pandemic

During the COVID-19 pandemic, New York City implemented a series of targeted initiatives to address rising food insecurity and to improve the resilience of its food system to shocks and stresses. Early in the pandemic, Mayor Bill de Blasio released *Feeding New York: The Plan for Keeping Our City Fed During the COVID-19 Public Health Crisis*, stating that "access to food is a fundamental human right. All New Yorkers should have equal ability and opportunity to access nutritious, affordable food in their communities".[132] Recognition of the human right to food and the city government's responsibility to help citizens realise that right underpinned New York City's response.

The plan addressed immediate food insecurity by creating two programs. The GetFoodNYC program connected residents with free food across the city, and the Taxi and Limousine Commission Food Delivery service employed taxi drivers and couriers to deliver food to vulnerable residents. The plan established a Pandemic Electronic Benefits Transfer program, which provided direct financial assistance to families with children in public school. Grocery store workers were also eligible for free childcare as essential workers. In addition to promoting food access, the plan also aimed to encourage food manufacturing in the city and to shorten food supply chains. City zoning was adapted to enable food distribution centres to locate in mixed-use industrial areas. The city invested US $170 million in total across the *Feeding New York* initiatives, including establishing a stockpile of 18 million shelf stable meals in case of disruption to food supply.

In February 2021, the Mayor's Office of Food Policy announced *Food Forward NYC*, the city's new 10-year food policy plan.[133] *Food Forward NYC* builds on work to improve food access during the first year of the pandemic. It sets out a long-term plan to address racial inequity in the food system and to promote dignified access to food, sustainable food production and a localised food economy. One of the key mechanisms for achieving these goals is participation in the Good Food Purchasing Program, a food procurement initiative that helps the city to align purchasing of food for government services with its goals of promoting a healthy, equitable and sustainable food system.[134]

132 City of New York (2020) *Feeding New York: The Plan for Keeping Our City Fed During the COVID-19 Public Health Crisis*. Available www1.nyc.gov/assets/home/downloads/pdf/reports/2020/Feeding-New-York.pdf (accessed 15 December 2021).

133 City of New York (2021) *Food Forward NYC: a 10-year food policy plan*. Available www1.nyc.gov/assets/foodpolicy/downloads/pdf/Food-Forward-NYC.pdf (accessed 15 December 2021).

134 Center for Good Food Purchasing (2017) *Good Food Purchasing Program*. Available https://goodfoodpurchasing.org/program-overview/ (accessed 15 December 2021).

3.3 Regenerative and agroecological production systems

3.3.1 Introduction

Regenerative agriculture and agroecology are related approaches to agriculture that emphasise working with and restoring natural ecosystems.[135] They have a common focus on improving the health of soils and waterways, and on minimising the use of external inputs, such as feed, synthetic fertilisers and pesticides. Both approaches focus on building soil organic matter, diversifying production and integrating livestock into mixed farming systems for nutrient recycling. The approaches have practices in common, including crop and pasture rotation, no till cultivation to minimize soil disturbance and the use of cover crops to reduce soil erosion.[136,137,138]

'Regenerative agriculture' is more commonly associated with ecological farming in Australia and countries like the United States[139], while agroecology has its roots in smallholder farming and is associated with the global peasant farmer movement La Via Campesina (and the concept of food sovereignty). Agroecology is also associated with ecological farming in Europe and other parts of the world.[140] Both terms are used by farmers and others in Australia to describe agricultural approaches that focus on regenerating natural ecosystems.[141]

Regenerative agriculture and agroecology form part of a diverse range of farming approaches that can enhance the resilience of agricultural systems.[142] These regenerative approaches aim to eliminate the degradation of land and water systems that has been associated with conventional agriculture and to restore the natural ecosystems on which food production depends. The evidence base for these regenerative approaches in an Australian context is emerging. However, agroecology "and other approaches that work with natural processes" were highlighted in the 2022 assessment report of the Intergovernmental Panel on Climate Change as agricultural approaches that can support food security and a variety of ecosystem services, including biodiversity, pollination and carbon sequestration.[143]

Left: stock.adobe.com/Drazen

135 Cusworthy, G., Garnett, T. and Lorimer, J. (2021) Agroecological break out: Legumes, crop diversification and the regenerative futures of UK agriculture. *Journal of Rural Studies* 88: 126-37.

136 Schreefel, L., Schulte, R., de Boer, I., Schrijver, A. and van Zanten, H. (2020) Regenerative agriculture – the soil is the base. *Global Food Security* 26 100404;

137 Gosell, H., Gill, N. and Voyer, M. (2019) Transformational adaptation on the farm: processes of change and persistence in transitions to 'climate smart' regenerative agriculture. *Global Environmental Change* 59: 101965

138 Altieri, M. and Nicholls, C. (2020) Agroecology and the reconstruction of a post-COVID-19 agriculture. *The Journal of Peasant Studies* 47 (5): 881-898.

139 Gosell, H., Gill, N. and Voyer, M. (2019) As above.

140 Altieri, M. and Nicholls, C. (2020) As above.

141 For example, DPIRD (2021) *Regenerative agriculture and pastoralism in Western Australia*. Department of Primary Industries and Regional Development, Western Australia; Mornington Peninsula Shire (2021) Food economy and agroecology strategy 2022-2027. Draft September 2021. Mornington Peninsula Shire.

142 Olsson, L., Barbosa, S., Bhadwal, A., Cowie, K., Delusca, D., Flores-Renteria, K., Hermans, E., Jobbagy, W., Kurz, D., Li, D., Sonwa, L., Stringer, (2019) Land Degradation. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)].

143 IPCC (2022) As above, p24.

Regenerative approaches can sequester carbon below ground in soils and above ground through reforestation and revegetation. For example, regenerative grazing practices can increase natural tree regeneration on farms.[144] Carbon sequestration through improving degraded pastureland and reforestation shows potential to make a meaningful contribution to climate mitigation, but soil carbon in improved cropping systems decreases over time.[145] More research is needed into the potential benefits of regenerative approaches to agriculture in a Victorian context. The Government of Western Australia is supporting farmers and researchers to develop an evidence base about the potential benefits of regenerative agriculture in the state.[146] A Regenerative Agriculture Roundtable has been established and a network of farmers interested in sharing innovative regenerative practices.[147] Similar initiatives are needed in Victoria to explore the potential of regenerative agriculture and agroecology to promote resilient food systems in the state.

3.3.2 What should policy aim to achieve?

This narrative describes the outcomes that policy should aim to achieve by 2050:

Regenerative food production is commonplace in Melbourne's foodbowl in 2050. Farming areas are a mosaic of forests and grasslands, where regenerative farms use extensive tree and grass cover. Regenerative farms provide Melbourne's population with a wide range of nutritious foods, including meat and dairy, grains, fruit, vegetables, nuts and legumes. Producers grow a diverse range of Australian and exotic tree species in silvopasture, windbreaks, riparian zones and on ridgelines. These trees provide timber, animal shelter and fodder, as well as wind protection, and biodiversity for habitat. Regenerative farming delivers multiple benefits to the city, including sequestering carbon and increasing green space. Livestock production contributes to soil restoration and nutrient cycling as an integral part of regenerative farming approaches that offer high levels of animal welfare.

Regenerative and agroecological farming practices are supported by industry groups, government and the community. Growers generate income from a diverse range of products and services, including natural capital management and carbon sequestration. Levels of farmer well-being are high. There are opportunities for growers to learn about regenerative and agroecological practices to support their transition to regenerative production systems. First Nations Australians lead a thriving native foods industry and play an important role in shaping and leading restorative land management and agricultural practices across Victoria, increasing well-being and opportunities in their communities.

Well established regenerative farms operate as complex ecosystems and are proving resilient to climate change impacts. Uptake of agroecological practices has reduced the use of synthetic farm chemicals and fertilisers. Soils that are high in organic matter hold moisture during droughts, and drought hardy perennial crops provide harvests with minimal irrigation. Farmers in peri-urban areas also have access to high quality recycled water. Perennial fodder crops provide a 'living haystack' for livestock. Evaporation and wind damage are minimised by windbreaks, and during heavy rainfall, healthy soils are held together by cover crop vegetation that resist erosion. High levels of biodiversity and crop diversity help to prevent and manage pest and disease outbreaks and strengthen the resilience of farms to climate shocks and stresses.

144 Fischer, J., Stott, J., Zerger, A. and Forrester, R. (2009) Reversing a tree regeneration crisis in an endangered ecoregion. *PNAS* 106 (25): 10386-10391.

145 Meyer, R., Doran-Browne, N., Dooley, K. and Eckard, R. (2020) *Achieving net negative emissions in a productive agricultural sector: A review of options for the Australian agricultural sector to contribute to the net-zero economy*. Energy Transition Hub. Also see IPCC (2019) As above.

146 See DPIRD (2021) Regenerative agriculture and pastoralism in Western Australia. Department of Primary Industries and Regional Development, Western Australia. Available: https://www.agric.wa.gov.au/land-use/regenerative-agriculture-and-pastoralism-western-australia (accessed 30 March 2022).

147 See https://www.regenwa.com/

3.3.3 Recommendations

1 Support farming communities to co-develop regional plans for sustainable production systems that generate net zero emissions

What

Implement a process for farming communities to develop place-based plans for transitioning to sustainable production systems that produce net zero emissions. Empower farming communities to collaborate with industry, government, First Nations peoples and other relevant stakeholders in developing these plans.

a. **Fund regional forums in farming communities that bring together diverse stakeholders to develop visions and pathways for regenerative and agroecological farming.** These regional forums should deliver action plans for transitioning to sustainable production systems that generate net zero emissions in the region.

b. **Provide support and funding to farming communities to implement priority actions that emerge from regional forums.** Farmers need funding and extension services to enable them to transition to sustainable 'net zero emissions' farming approaches through implementing place-based action plans.

Who

State, local and federal government; catchment management authorities; First Nations peoples, Landcare networks, primary industry peak bodies

Why

Successfully implementing sustainable production systems that produce net zero emissions requires a regional approach, adapted to the context of specific bio-regions. It also requires a collaborative approach, which supports farmers and other stakeholders to develop shared visions and action plans. Opportunities to collaborate and share knowledge within farming communities are particularly important in seeding and spreading innovative farming practices.

2 Support regenerative and agroecological farming approaches through state and local government agriculture policy

What

Include objectives in state and local government agriculture policy to support farmers to adopt regenerative and agroecological approaches to farming systems. Also implement strategies to incentivise and support the adoption of regenerative and agroecological approaches.

Who

State and local government

Why

Regenerative and agroecological farming approaches have the potential to generate benefits that include carbon sequestration, promoting biodiversity and pollination services.[148] However, these approaches have received little emphasis or funding in state, local or federal government agriculture policy.

148 IPCC (2022) As above.

3 Establish outcome-based metrics and benchmarks for sustainable agricultural land management, including regenerative and agroecological farming systems

What

Develop clear advice for farmers on effective regenerative and agroecological land management practices. Also establish outcome-based metrics and benchmarks for regenerative and agroecological approaches, as the basis for incentivising good practice. This will require collaboration between farmers, researchers and policy makers to strengthen the evidence base on regenerative and agroecological approaches in a Victorian farming context.

a. **Develop clear advice for farmers** on effective regenerative and agroecological farming practices in a Victorian context.

b. **Develop metrics and frameworks for measuring the outcomes** of regenerative and agroecological land management practices and establish benchmarks for Victoria. This could include measurement of outcomes related to carbon emissions and storage, water quality and runoff, soil health and biodiversity.

c. **Develop simple and accessible processes and tools for on-farm measurement** of the outcomes of regenerative and agroecological practices. Support farmers to share these outcomes to facilitate reporting, practice improvement and marketing.

Who

Regenerative and agroecological farming groups, universities, industry bodies, state and local government, federal government

Why

Measuring and communicating the outcomes of sustainable farming approaches is important in incentivising and rewarding farmers for adopting these practices. Metrics can underpin the development of certification schemes that enable consumers and investors to support regenerative and agroecological practices. They can also support government incentive schemes to encourage uptake of the approaches and continuous improvement in all aspects of on-farm practices.

4 Incentivise farmers to adopt sustainable farming practices by paying them to provide ecosystem services and by providing loans and direct investment

What

Incentivise farmers to improve environmental outcomes on land that they manage. This could include incentives to protect land for environmental outcomes (changing its agricultural use or sometimes removing it from agricultural use) or to plant native grasses and shrubs, or carbon sequestration in trees and soils.

a. Reward ecological outcomes and good practice with reduced local government rates or direct ‘eco-payments’.

b. Provide loans, rebates and grants to support farmers to transition to and scale-up regenerative and agroecological farming practices. This could include support to adopt outcome-based metrics and to establish baseline data for farms.

Who

Farmer groups and industry bodies, private investors, state, local and federal government

Why

Regenerative and agroecological farming systems have the potential to deliver significant public benefits. Public investment and support is important to incentivise adoption of these approaches.

5 Provide learning opportunities to support farmers in adopting regenerative and agroecological practices and build the evidence base for these approaches

What

Provide learning opportunities for farmers in regenerative and agroecological practices and provide opportunities for early adopters of these approaches to share their knowledge with other farmers (e.g. field days, networks). In addition, fund collaborative research (involving regional development corporations, farmers, universities and policy makers) to build the evidence base about regenerative and agroecological approaches in a Victorian context.

a. Fund innovative pilot projects that trial regenerative and agroecological production techniques for new products, plant varieties, crops, regions or markets.

b. Fund research that is co-developed by universities and farmers to develop an evidence base for regenerative agriculture and agroecology in Victoria.

c. Provide training and networking opportunities in regenerative and agroecological farming and opportunities for early adopters to share their knowledge.

Who

State and federal government, philanthropy, regional development bodies, industry bodies

Why

Uptake of regenerative and agroecological farming practices will be enabled through learning opportunities for farmers, demonstration sites, and by supporting development of a strong evidence base for the approaches. The evidence base for regenerative and agroecological agriculture has been under-funded in Australia, and there are significant evidence gaps about where, when and how to apply the approaches and their benefits.

6 Support Victorian Traditional Owners to recover and apply knowledge and practices of traditional food production*

What

Support and fund First Nations land management and justice initiatives, including work to develop self-determination through Indigenous food and farming enterprises.

a. Provide funding and support for Victorian Traditional Owners to restore their knowledge and practices of traditional food production and to develop food and farming enterprises.* Collaborate with Victorian Traditional Owners to explore the benefits of applying Indigenous land management perspectives to food production more broadly in Victoria.

b. Facilitate access to land, resources and capital to support Victorian Traditional Owners in reclaiming custodianship of their knowledge and practices in native food production and restoring their leadership of the Victorian native foods industry.*

c. Support pathways for First Nations peoples into the agriculture sector by co-developing education and training opportunities, and by enabling access to land, resources and capital.

** Based on recommendations in the Victorian Traditional Owner Native Foods and Botanicals Strategy (see https://www.fvtoc.com.au/native-foods-and-botanicals)*

Who

Local, state and federal government, philanthropy, First Nations Bushfood & Botanical Alliance Australia

Why

Colonisation has significantly undermined the foodways of Victoria's First Peoples and has denied their rights to practice traditional approaches to food production on their lands. The emerging native foods industry threatens to repeat past injustices, as only a small proportion of businesses are Indigenous-owned and controlled.[149] Victoria's Traditional Owners must feel safe and supported (through access to land and capital) to restore traditional knowledge and practices in food production and to regain leadership of the emerging native foods industry. There is also a need to collaborate with Victoria's Traditional Owners to investigate how knowledge of traditional food production and land management practices can inform approaches to agriculture in Victoria that are well adapted to local ecosystems and climate and that can reverse damage to land and river systems from a legacy of intensive agricultural practices.

3.3.4 Potential enablers and barriers to implementing the recommendations

Stakeholders identified a range of potential barriers and enablers to implementing these recommendations:

Enablers

- There are strong networks and leaders across regional farming communities, which can support knowledge sharing about regenerative and agroecological approaches and help to build collective visions and pathways for sustainable farming transitions.
- Social and market demand is likely to build for regenerative and agroecological food production. The transition towards regenerative and agroecological food production can also be accelerated by financial incentives (such as those outlined in Recommendation 4), as well as broader investment in regenerative and agroecologically produced food.

Barriers

- There is an emphasis in Victorian and federal government agriculture policy on promoting 'sustainable intensification' as an approach to reducing the environmental impacts of food production. This focus may limit potential policy support for regenerative and agroecological approaches.
- There is no one commonly understood definition of regenerative agriculture or agroecology and a diverse range of farming practices is associated with the approaches. This makes it challenging to develop a shared vision among farmers and other stakeholders for transitioning to regenerative and agroecological approaches.
- There is a lack of funding to support research into regenerative and agroecological farming approaches in Australia, and significant gaps exist in the evidence base about where, when and how to apply the approaches and their benefits
- Current food systems externalise the environmental costs of food production, and farmers don't always receive a price premium for adopting regenerative and agroecological practices.

Right: pexels.com/Karolina Grabowska

149 Honan, K. (2021) Demand for bush food is booming, so why are so few Indigenous people involved in the sector? *ABC Rural* 9 July 2021. Available: https://www.abc.net.au/news/2021-07-09/native-food-sector-seeks-connection-with-indigenous-australia/100271318 (accessed 26 April 2022).

Incentivising sustainable farming practices through eco-payments

Paying farmers for the ecosystem services that they provide is an important way to incentivise and reward sustainable land management. Eco-payment programs are being rolled out across the world, including in Australia through the Emissions Reduction Fund (ERF).[150] A common goal of these schemes is to incentivise farmers to adopt environmentally beneficial practices that support a range of ecosystem services, from sequestering carbon in soils to increasing on-farm biodiversity.

The Conservation Reserve Program, supported by the United States Department of Agriculture, provides yearly payments to farmers in the United States who remove environmentally sensitive land from agricultural production and revegetate it with native plant species.[151] The program aims to improve water quality, prevent soil erosion, and reduce wildlife habitat loss.

The Queensland Government's Land Restoration Fund buys carbon credits from farms that sequester carbon in soils and demonstrate other economic, environmental, or social co-benefits from their carbon farming.[152] The fund takes into account farm initiatives that increase biodiversity, improve water quality and build economic opportunities in regional communities.

From 2023, the European Union's Common Agricultural Policy will allocate 25% of its direct payment budget to eco-payments for farmers who practice agroecology, carbon farming, organic farming, and other sustainable farming approaches.[153] This will directly incentivise wider uptake of sustainable farming practices.

Regen Network's[154] open marketplace allows farmers to sell eco-credits directly to individuals and businesses around the world. To calculate eco-credits, they assess a range of on-farm properties from soil organic carbon to health and density of vegetation, using remote sensing and on-the-ground data collection.[155]

150 Australian Government Clean Energy Regulator (2021) *Emissions Reduction Fund*. Available www.cleanenergyregulator.gov.au/ERF (accessed 4 April 2022).

151 United States Department of Agriculture Farm Service Agency (2021) *Conservation Reserve Program*. Available https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index (accessed 4 February 2022).

152 Queensland Government (2021) *The Land Restoration Fund*. Available www.qld.gov.au/environment/climate/climate-change/land-restoration-fund (accessed 4 February 2022).

153 European Commission (2021) *The new common agricultural policy: 2023-27*. Available https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/new-cap-2023-27_en (accessed 4 February 2022).

154 Regen Network (2020) *Program guide*. Available https://regen-registry.s3.amazonaws.com/Regen+Registry+Program+Guide.pdf (accessed 4 February 2022).

155 Regen Network (2021) *Methodology for GHG and co-benefits in grazing systems*. Available https://regen-registry.s3.amazonaws.com/Methodology+for+GHG+and+Co-Benefits+in+Grazing+Systems.pdf (accessed 4 February 2022).

Measuring the economic value of environmental services on farm through natural capital accounting

Natural capital accounting is a promising tool for measuring the benefits of ecosystem services (such as clean air or healthy soil) in economic terms. Quantifying the ecosystem services that support food production is important to enable eco-payments for sustainable farming. There are a number of natural capital accounting models.

The Economics of Ecosystems and Biodiversity (TEEB)[156] is an international initiative that advises governments about "measuring what matters". The TEEB evaluation framework provides a critical tool to ensure that assessments take a food systems approach. TEEB works alongside the United Nations System of Environmental Economic Accounting (SEEA).[157] As of 2020, SEEA is being actively implemented in 89 countries, and it serves as an international benchmark for many other similar schemes. SEEA's core measurements focus on mapping environmental flows like nutrient and water cycles, taking stock of environmental assets and their changes over time, and economic activity related to the environment.

There are also several emerging natural accounting systems tailored to the Australian context. One example is Accounting for Nature. Its standards are consistent with those of SEEA, and it has been implemented for over a decade in Australia at regional and property scales.[158] Environmental Outcome Verification (EOV), developed by the Savory Institute in the United States, is also used in Australia and around the world as an ecological health measurement tool for the Land to Market regenerative certification scheme.[159] It is currently restricted to farms producing meat, wool, leather, and dairy, but is being expanded to include other production systems.

ClimateWorks Australia and La Trobe University are also undertaking smaller-scale projects to measure and communicate agricultural land health and to promote effective management of natural capital.[160,161] However, there are currently many different schemes with varying standards, and more consensus is needed to scale up natural capital accounting.

156 See http://teebweb.org/

157 See https://seea.un.org/

158 See www.accountingfornature.org/

159 See https://landtomarket.com.au/verification.php

160 See https://www.latrobe.edu.au/research/centres/environment/future-landscapes/research/interventions/natural-capital-accounting

161 ClimateWorks Australia (2021) *Natural Capital Measurement Catalogue*. Available https://www.climateworksaustralia.org/resource/natural-capital-measurement-catalogue/ (accessed 22 April 2022).

Image: pexels.com/Alejandro Barrón

3.4 Protected closed-loop and urban agriculture

3.4.1. Introduction

Protected closed-loop agriculture and urban agriculture can contribute to the resilience of food systems as part of a diverse range of approaches to sustainable food production. Protected agriculture (also known as protected cropping) is food production that takes place in indoor environments where it is protected from climate extremes, pests and disease. Protected agriculture includes food production in greenhouses, glasshouses and high tech vertical farms.[162] It may include soil-based production in polytunnels, but production is typically soil-less in hydroponic or similar systems, and it is often located in urban environments.[163]

Protected agriculture is often energy-intensive, particularly in high tech climate-controlled systems[164], so it is important that these systems are powered by renewable energy, such as solar or wind. These systems can 'close the loop' in other ways by using recycled nutrients and energy. Protected agriculture enables year round production of crops, typically of highly perishable vegetables and some fruits, such as berries. It is estimated that 30% of Australian farmers use some form of soil-less agriculture or protected cropping, and that it comprises around 15% of the value of vegetable and cut-flower production in Australia.[165] It is an emerging and rapidly growing industry.

Urban agriculture (also referred to as urban and peri-urban agriculture) is food production that takes place within or on the peri-urban fringe of a town or a city. It includes activities such as growing fruit and vegetables and raising animals on urban farms, community gardens, vacant lots, backyards, verges, rooftops, and in high-yield protected cropping systems.[166]

Urban and peri-urban agriculture plays an important role in feeding Melbourne and ensuring the city's food security. Melbourne's foodbowl grows around 47% of the vegetables produced in Victoria, contributes to the regional economy and creates local employment.[167] Urban and peri-urban agriculture has environmental, health and wellbeing benefits. It reduces the heat island effect, provides opportunities for learning and recreation, connects communities and enhances civic engagement.[168] It can also enhance the resilience of food systems, particularly to climate risks, as part of a suite of climate adaptation tools.[169]

3.4.2 What should policy aim to achieve?

This narrative describes the outcomes that policy should aim to achieve by 2050:

In 2050, everywhere you look in Melbourne's urban areas you see a diverse range of food being produced in previously underutilised spaces. Regulatory barriers to food production in urban areas have been removed. Community gardens and urban farms are located on underutilised land to maximise food production.

Controlled environment production takes place in industrial estates and on the sites of old factories and warehouses that are unsuitable for soil-based production. Climate-controlled greenhouses powered by renewable energy make efficient use of recycled nutrients for 'closed-loop' production. This protected closed-loop production is also drought-resilient, making use of captured rainwater, stormwater and recycled water. It provides a continuous year-round supply of fresh fruit and vegetables for Melbourne's population.

162 Future Food Systems (2021) Protected cropping: current technologies and target crops. Australian Government Department of Industry, Science, Energy and Resources. Available: https://www.futurefoodsystems.com.au/wp-content/uploads/2021/04/P2-004-Protected-cropping.pdf (accessed 31 March 2022).

163 Future Food Systems (2021) As above.

164 McCartney, L. and Lefsrud, M. (2018) Protected agriculture in extreme environments: A review of controlled environment agriculture in tropical, arid, polar and urban locations. *Applied Engineering in Agriculture* 34 (2): 455-473.

165 Protected Cropping Australia (2020) *Growing Protected Cropping in Australia to 2030. Submission*, Australia.

166 Sarker, A., Bornman, J. and Marinova, D. (2019) A Framework for Integrating Agriculture in Urban Sustainability in Australia. *Urban Science* 3 (2): 50.

167 Carey, R., Larsen, K., Sheridan, J. and Candy, S. (2016) *Melbourne's food future: Planning a resilient city foodbowl*. Victorian Eco-Innovation Lab, University of Melbourne, Australia.

168 Kingsley, J., Egerer, M., Nuttman, S., Keniger, L., Pettitt, P., Frantzeskaki, N., Gray, T., Ossola, A., Lin, B., Bailey, A., Tracey, D., Barron, S. and Marsh, P. (2021) Urban agriculture as a nature-based solution to address socio-ecological challenges in Australian cities. *Urban Forestry & Urban Greening* 60: 127059.

169 IPCC (2022) As above.

3.4.3. Recommendations

1 Review barriers to the development of protected closed-loop and urban agriculture

What

An integrated policy framework is required across multiple levels of government to promote protected closed-loop and urban agriculture. This policy framework should encompass a range of policy portfolios including land use, environment, water, energy, finance and food regulation. A policy review is also needed to understand the challenges and opportunities for the protected agriculture industry.

a. Revise land use planning policy and regulations to promote agriculture in urban and peri-urban areas. The policy barriers to protected and urban agriculture should be identified at state and local government level. Planning policies should provide clear guidelines for the development of protected closed-loop production systems and urban farms, balancing food production in urban and peri-urban areas with other uses.

b. Identify underutilised land and buildings in urban areas that are suitable for food production. Local governments should identify underutilised public land and buildings in their municipalities that could be used for food production. Local governments could work with communities to identify groups interested in producing food on these sites and could provide incentives to encourage their use for food production.

Who

Federal government, state government, local government

Why

An integrated policy framework would support the growth of protected closed-loop agriculture and urban agriculture, providing certainty for investors and producers. There are benefits in locating protected cropping in urban and peri-urban areas because of the proximity to labour, support industries and markets. However, land use planning conflicts can arise over the visual amenity of protected cropping in peri-urban areas. Community food production in urban areas (e.g. community gardens, school gardens, urban farms, backyard gardens) contributes to food security and increases the resilience of local food systems. It also increases food literacy and builds community.

2 Invest in protected closed-loop agriculture through new funding mechanisms and tax incentives

What

Build the protected agriculture industry by investing in innovative approaches and providing grants to encourage protected cropping on land that is not suitable for soil-based production. Government support for renewable energy can also offset the higher energy inputs required for controlled environment agriculture.

a. Invest in **innovative pilots and demonstrations** of protected closed-loop agriculture projects that are powered by renewable energy

Who

Federal government, state government, local governments, industry groups

Why

Protected cropping is energy intensive and requires significant investment to establish energy systems to heat and cool greenhouses and for irrigation. However, access to capital is a barrier to growth of the industry. In peri-urban areas, one of the biggest challenges to establishing closed-loop systems is ensuring access to sustainable energy and water sources

3 Establish training pathways in protected closed-loop and urban agriculture to create a skilled local workforce

What

New training opportunities and employment pathways are needed in protected closed-loop and urban agriculture. Free government-funded places should be extended to courses in intensive horticulture and protected closed-loop agriculture, and targets should be set to establish a skilled workforce for the sector.

Who

Federal government, state government, universities and TAFEs, industry representative groups

Why

Protected cropping is labour intensive, and access to skilled labour is a key challenge. Demand for skilled workers in the industry is high and relies on sourcing highly skilled technicians from overseas.[170] However, as the growing season is year-round rather than seasonal, local communities could supply the necessary workforce. There are opportunities for education providers to work with the industry to create education and training pathways to grow a skilled local workforce.

4 Develop urban planning guidelines and templates for protected closed-loop and urban agriculture

What

Urban planning practice notes and guidelines are needed to guide the development of urban agriculture and protected closed-loop agriculture systems in urban and peri-urban areas.

Who

State government, local government

Why

There is little planning policy guidance to support development of the protected closed-loop agriculture sector and urban agriculture. Urban planners in local government require support and upskilling in agricultural planning, including planning for protected closed-loop and urban agriculture.

170 Protected Cropping Australia (2020) *Growing Protected Cropping in Australia to 2030.* Submission. Australia.

3.4.4. Potential enablers and barriers to implementing the recommendations

Stakeholders identified a range of potential barriers and enablers to implementing these recommendations:

Enablers

- The pandemic has highlighted how quickly food system actors from government, industry and civil society can respond to shocks and stresses. A long-term plan is now needed for the role of protected closed-loop and urban agriculture in resilient food systems.
- Increased funding and resources for research, development and extension programs will support the growth of protected closed-loop agriculture.

Barriers

- Growing circular food economies requires collaboration between departments and government at all levels. Circular food systems and protected closed-loop agriculture cross policy portfolios and are not the core business of any one sector. There are multiple actors to coordinate with diverging and overlapping interests.
- There is limited public understanding about how vulnerable food systems are to climate change and other shocks and stresses. A range of production systems are important for increasing food security, including protected closed-loop and urban agriculture.

Right: stock.adobe.com/ball141030

Promoting urban agriculture through local government policy in Washington D.C.

Washington D.C. is emerging as a leader in urban agriculture, with urban farms, community gardens, and school gardens proliferating across the city. This is due in part to pioneering legislation introduced by the city that supports farmers to access land and capital. The *D.C. Urban Farming and Food Security Amendment Act of 2016* establishes two important programs:[171]

1. **An Urban Farming Land Lease Program** that facilitates the lease of government land to urban farmers at no cost for 5 to 13 years.
2. **An Urban Agriculture Tax Credit that** provides property tax abatements to private landowners who lease their property (including rooftops) for urban agriculture.

In 2019, the city government created an Office of Urban Agriculture within their Department of Energy and Environment to co-ordinate urban agriculture initiatives. This Office also oversees the **Urban Agriculture Infrastructure Grant**, an annual grant program that aims to advance sustainable urban farming, particularly for the benefit of socially marginalised farmers, through grants of up to US$25,000.[172]

The 2019 *Sustainable D.C. 2.0* plan also includes goals related to urban agriculture, such as bringing 20 acres of urban land into farming by 2032 and supporting school gardens and kitchen garden education.173 The city government works closely with the D.C. Food Policy Council on urban agriculture projects and other food policy issues, which helps ensure that stakeholders' views are taken into account in city government decision-making processes.

171 Washington D.C. City Council (2016) D.C. *Urban Farming and Food Security Amendment Act of 2016*. Available https://lims.dccouncil.us/Legislation/B21-0293?FromSearchResults=true (accessed 4 December 2021).

172 Washington D.C. Department of Energy & Environment (2021) *Urban Agriculture Infrastructure Grant*. Available https://doee.dc.gov/release/notice-funding-availability-2021-urban-agriculture-infrastructure-grant (accessed 4 December 2021).

173 Washington D.C. Mayor Muriel Bowser (2020) *Sustainable DC 2.0 Plan*. Available https://sustainable.dc.gov/sdc2 (accessed 4 December 2021).

Vertical farming to increase fresh food supply in Singapore

As an island state with limited scope for food production, Singapore has historically relied on food imports to ensure its food security. However, threats to global food supply chains from climate change and the COVID-19 pandemic highlight the need for Singapore to adapt its food security strategy. One way that Singapore is adapting is through the national government's 30 by 30 campaign, which aims to meet 30% of Singapore's nutritional needs locally by 2030.[174] Singapore plans to do this by boosting the capacity of its local agri-food industry. The program is led by the Singapore Food Agency (SFA), which was created to centralise farming and food-related functions from multiple government agencies.

Since local farmland is limited, the emphasis in the *30 by 30* campaign is on promoting indoor, vertical farming in urban areas. There is also an emerging focus on closed-loop production systems that minimise the use of inputs and energy. To catalyse innovation, the SFA provides grants through several different funding schemes.[175] The Agri-Food Cluster Transformation Fund supports commercial-scale, automated farming solutions that can be integrated into food production, harvest, and waste treatment technologies. The Agriculture Productivity Fund supports the development of high-tech farming systems with sophisticated environmental controls to boost productivity. An Agri-Food Innovation Park is also being developed as a "pilot-cluster" to promote further innovation in high-tech indoor farming.

To facilitate land access to vertical farming in urban areas, the Singapore Government's Farmland Tender Program helps farmers to acquire land, prioritising high intensity, sustainable, closed-loop production.[176] Singapore has broadened its classification of 'agriculture' in land use planning policy to create a more flexible process for approving urban farms to co-locate on residential and commercial sites. In order to boost consumer demand for locally grown foods, the SFA has also introduced the SG Fresh Produce Logo, which helps consumers to identify products grown in Singapore, as well as co-organising the SG Farmer's Market.

174 Singapore Food Agency (2019) *Raising local production with 30 by 30 goal*. Available www.sfa.gov.sg/food-farming/sgfoodstory/grow-local (accessed 4 December 2021).

175 Singapore Food Agency (2021) *Funding Schemes*. Available www.sfa.gov.sg/food-farming/funding-schemes (accessed 4 December 2021).

176 Singapore Food Agency (2017) *A new approach to farm land tenders*. Available www.sfa.gov.sg/food-for-thought/article/detail/a-new-approach-to-farm-land-tenders (accessed 4 December 2021).

3.5 Circular food economies

3.5.1. Introduction

Current food systems are linear. They use vast amounts of limited natural resources to produce food and dispose of wasted food and byproducts in ways that discard valuable nutrients, like phosphorous, nitrogen and other materials from the system. They also have damaging impacts on natural ecosystems (see section 2.6). A circular economy for food re-uses natural resources efficiently, designs out waste and pollution, and regenerates natural ecosystems.[177]

There are economic, social and environmental benefits to avoiding waste, and to reducing, reusing and recycling food and organic waste resources. Organic waste in landfill is responsible for approximately two per cent of Australia's greenhouse gas emissions.[178] Building a circular food economy will help Victoria to meet its targets under UN Sustainable Development Goal 12 to halve food waste by 2030 and to reduce losses through food supply chains.[179]

Cities are an ideal place for building circular food economies. Abundant food and organic waste resources are generated in Melbourne that can be processed into compost to builds soils on farms in the city's foodbowl. Up to 650,000 tonnes of organic waste could be diverted from landfill each year if all Victorian households had access to food and garden waste recycling services. Approximately 1.1 million tonnes of organic waste is recovered in Victoria, producing 500,000 tonnes of compost and soil conditioner, and 600,000 tonnes of mulch.[180] Compost is a bulky product that is expensive to transport, so using it close to the city where much of the waste is generated reduces transport costs.

Cities also produce large amounts of wastewater that can be reused as part of circular food economies. Melbourne's water treatment plants have schemes that deliver recycled water to farms in Melbourne's foodbowl. However, a relatively small proportion of the wastewater processed by the city's water treatment plants is used in this way.[181] There are opportunities to increase the use of recycled water and treated stormwater in urban and peri-urban agriculture as part of a circular food economy.[182] This will be important as the availability of water for food production continues to decrease in a warming and drying climate.

Left: Image courtesy of Bjorn Low

177 Ellen MacArthur Foundation (2019) *Cities and Circular Economy for Food*, Cowes, UK.

178 Commonwealth of Australia (2018) *National Waste Policy: less waste more resources,* Canberra, Australia.

179 See www.un.org/sustainabledevelopment/sustainable-development-goals/

180 Department of Environment, Land, Water and Planning (2020) *Recycling Victoria. A new economy.* Melbourne, Australia

181 Melbourne Water (2021) *Melbourne Water annual report 2020-21*. Melbourne, Australia.

182 Carey, R., Larsen, K. and Sheridan, J. (2019) *Roadmap for a resilient and sustainable Melbourne foodbowl*. University of Melbourne, Australia. doi.10.26188/5c92e85dd6edf

3.5.2. What should policy aim to achieve?

This narrative describes the outcomes that policy should aim to achieve by 2050:

In 2050, people value food and water 'waste' as important resources. They understand the role of these resources in a circular food economy and there is minimal contamination of kerbside organics waste. During the 2020s and 30s, government, industry and researchers collaborated to enable a shift to a circular food economy. Shocks and stresses to the food system are now common due to the climate crisis, but recycling of nutrients and water supports resilient local food production and increases the food security of Melbourne's population.

Stormwater and recycled water are reused in food production. Organic waste, food waste, biosolids, animal manure and by-products from food processing are processed for reuse in agriculture. Food waste is prevented or re-used. It is converted into animal feed, compost and bio-fertilisers for farming in Melbourne's foodbowl. Farmers build soils using fit-for-purpose products, and they have access to high quality recycled nutrient solutions for use in controlled-environment production systems.

Water reuse is managed holistically to ensure that farmers in Melbourne's foodbowl have a reliable supply of affordable, fit-for-purpose water. Extensive infrastructure now supplies recycled water from water treatment plants to irrigation districts on the city fringe, enabling full reuse of water. Regulation of fit for purpose inputs and effluents is responsive to climate change and technology changes and engenders a high degree of stakeholder confidence. Stormwater storage facilities supply water to urban farms and orchards throughout the suburbs and on the urban-rural interface. Protection for Melbourne's peri-urban agricultural land was strengthened in 2022, giving stakeholders the confidence to invest in the necessary infrastructure to improve water treatment systems.

3.5.3. Recommendations

1 Develop integrated policy and regulatory frameworks to promote a circular food economy

What

An integrated approach is required to support the development of circular food economies, which should be linked to policy on protected closed-loop and urban agriculture (see section 3.4). This requires significant investment in infrastructure, research, and innovation.

a. Establish mechanisms in government for **cross-portfolio collaboration to promote circular food economies**, including the water, waste, environment, energy and agriculture portfolios. Establish a lead agency to co-ordinate this initiative.

b. **Invest in infrastructure and research** to support the development of circular food economies (e.g. to expand use of recycled water and stormwater for food production) – also see section 3.4.2.

Who

Federal government, state government, water authorities, local government

Why

Three principles underpin a circular economy: eliminate waste and pollution, circulate products and materials, and regenerate nature. A circular food economy transforms the food system from a linear model of take, use, dispose into a new approach with health, environmental, and economic benefits.[183] Building circular food economies has policy co-benefits, aligning with the objectives of the UN Sustainable Development Goals, the Victorian Climate Change Strategy, and the Recycling Victoria policy.

2 Develop integrated assessment frameworks for costing the delivery and benefits of recycled water for agriculture

What

An integrated water management framework should be used to assess the cost of recycled water to users, taking into account future scenarios of greater water scarcity.

Who

Federal government, state government, local governments, water authorities, industry representative groups, growers

Why

New approaches to costing recycled water are needed to expand peri-urban food production and to promote the growth of circular food economies. The development of recycled water schemes for agriculture is expensive and the cost is generally borne by farmers. However, there are wide ranging community and environmental benefits to using recycled water in agriculture. These include conserving drinking water supplies, reducing discharge of waste water into the ocean and waterways, and health benefits such as increased food security. New policy settings can ensure that all urban water users contribute to the cost of treatment and distribution of recycled water, and support investment for longer-term benefits.

183 Ellen MacArthur Foundation (2019) *Cities and Circular Economy for Food*, Cowes, UK.

3 Investigate options for better matching the quality of water needed for different types of agriculture and crops as part of a 'fit-for-purpose' water framework

What

Investigate new approaches to increase the quality of recycled water and stormwater for agriculture, including reducing the salt content of recycled water. This includes research into new agricultural practices that are adapted to suit recycled water and stormwater. Recycled water and stormwater should be used for purposes that deliver the greatest community value, which includes irrigation for food production to ensure the food security of the Melbourne region.

Who

State government, Environment Protection Authority, water authorities

Why

Population growth and climate change are key drivers for increased use of alternate water sources, such as recycled water and stormwater. Water recycling reduces discharge into the ocean and can improve the reliability of the water supply. However, the salinity of wastewater needs to be reduced to improve the quality of recycled water delivered to farmers. Contaminants also need to be managed via effective treatment to ensure that recycled water and stormwater are safe and reliable inputs for use on farm.

4 Implement strategies to prevent and reduce organic waste across the food supply chain

What

Implement government and industry initiatives to prevent or reduce organic and food waste. Reuse of organic waste streams should aim to keep important nutrients, such as phosphorous and nitrogen, in the food system by preferencing uses such as animal feed (reuse) and composting (recycling) over waste to energy conversion (recovery).

a. Direct organic waste streams to their **most suitable reuse** to promote circular food systems. The reuse of organic waste streams that deliver the highest community value can be supported by establishing networks and partnerships between end users and waste stream managers to improve the flow of information and adaptation of supply chains.

b. **Reduce contamination** of organic and food waste streams through incentives as well as investment in behaviour change campaigns. Government policy that incentivises prevention, reuse and recycling by industry is a cost-effective option. This may include increased landfill costs or bans, incentives and subsidies. Consumer behaviour change campaigns are needed to reduce contamination of organic waste streams.

Who

Federal government, state government, local government, industry, producers, consumers

Why

In Australia, almost 60% of food waste is generated in the manufacturing process or by households. Around 45% of food waste is disposed of in landfill or in the sewer and wastewater systems.[184] There are opportunities to prevent and reduce food waste across the food system and to increase the volume of food waste reuse. However, reuse of organic materials is limited if contaminated during collection and processing by glass, plastics, and chemicals such as heavy metals and herbicides. Contamination increases the costs of processing and raises concerns among potential users about the risks of using organic composts. Much contamination can be avoided through behaviour change i.e. by educating consumers not to contaminate the resource stream with glass and plastics.

5 Improve uptake and use of organic inputs in agriculture

What

Provide support and advice to farmers on how to use organic inputs to achieve optimal production and support the transition from conventional fertilisers to alternate inputs. This may include input equivalency tools (e.g. chemical fertiliser to organic input streams) and support for managing real and perceived risks.

a. Collaborate with farmers to **develop fit-for-purpose compost products** that meet industry needs. Farmers are reluctant to use recycled nutrient products when they lack confidence that the products are free of contaminants, and companies are reluctant to invest in decontamination technologies until there is strong demand for the products. Collaborative processes will promote the development of user friendly and affordable inputs produced from organic waste materials.

b. Establish extension services to support **farmer training on effective use of organic inputs** from waste resources. Independent advice and evidence informed resources are important to facilitate the uptake of organic waste products. Extension services could be provided through state government extension officers or through improved support for private services, ensuring that advisors are up-to-date in sustainable farm management approaches. This could include support from agribusiness officers in local governments, Landcare coordinators and land management partners, such as catchment management authorities. Dissemination of best practice through peer-to-peer support programs is also an important strategy in transitioning to more sustainable practices.

Who

Federal government, state government, local governments, catchment management authorities, Landcare

Why

There is a gap in the information available to farmers on the use of organic waste streams. There are also gaps in state and federal government support for peri-urban farming and in extension and advisory support at the local level. Farmers need to be confident that reused organic streams are safe and reliable inputs for on-farm use. Appropriate regulation and guidelines to support safe food production systems builds confidence among producers and consumers.

184 Arcadis (2019) *National Food Waste Baseline: Final assessment report,* Sydney, Australia.

3.5.4. Potential enablers and barriers to implementing the recommendations

Stakeholders identified a range of potential barriers and enablers to implementing these recommendations:

Enablers

- Promoting circular food economies has environmental and economic co-benefits and synergies with climate change policy, circular economy policies and water policy.
- Circular food economies build food system resilience and food security. Increased understanding of the vulnerabilities and fragility of the food supply chain to shocks and stresses will create community demand for government leadership, and will drive community action and advocacy.
- Increased funding and resources for research, development and extension programs will support the growth of circular food economies.

Barriers

- Some potential policy settings to build circular food economies may be unpopular if they appear to curtail existing rights or raise costs (e.g. landfill costs or bans).
- Growing circular food economies requires collaboration between departments and government at all levels. Circular food systems and protected closed-loop agriculture cross policy portfolios and are not the core business of any one sector. There are multiple actors to coordinate with diverging and overlapping interests.

Right: pexels.com/Chait Goli

Building a circular food economy in Amsterdam

The Netherlands has long been known for its high tech and highly productive agriculture industries, despite the country's small size. However, it is now widening its focus to include circular agriculture and food systems. In 2020, Amsterdam became the first city in the world to set a goal to be fully circular by 2050 and to halve the use of new raw materials by 2030. These targets are laid out in the *Amsterdam Circular Strategy 2020-2025*.[185] The strategy focuses on three key pillars: food and organic waste streams, consumer goods and the built environment.

The 'food and organic waste streams' pillar employs a cross-cutting circular food economy framework that prioritises short food supply chains, healthy and sustainable food, and high-quality processing and separation of organic waste streams. Actions include promoting urban agriculture, purchasing regionally-produced food, developing separated organic waste collection for each neighborhood, and closing nutrient cycles within the city. Amsterdam also plans to roll out public awareness campaigns to increase household organic waste recycling and to reduce contamination of waste streams. The city is developing a monitoring system to track progress in building the circular economy by measuring the flow of materials in and out of the city, along with associated greenhouse gas emissions.[186]

Amsterdam's two food policy councils (one representing citizen initiatives and the other representing municipal and provincial governments) have helped to put food on the city's agenda. The Dutch national government has also made circular agriculture a priority and incentivises the development of alternative food growing systems through schemes for research and development.[187] This alignment of city and national government policy goals supports Amsterdam in taking bold policy decisions to promote circular food systems.

185 City of Amsterdam (2020) *Amsterdam Circular Strategy 2020-2025*. Available www.amsterdam.nl/en/policy/sustainability/circular-economy/ (accessed 4 December 2021).

186 City of Amsterdam (2020) *Amsterdam Circular Monitor*. Available https://assets.amsterdam.nl/publish/pages/867635/amsterdam_circular_monitor.pdf (accessed 4 December 2021).

187 Ministry of Agriculture, Nature and Food Quality of the Netherlands (2019) *The Dutch government's plan to support the transition to circular agriculture.* Available www.government.nl/documents/policy-notes/2019/11/30/plan-of-action---supporting-transition-to-circular-agriculture (accessed 15 December 2021).

3.6 Local and regional food supply chains

3.6.1. Introduction

Building local and regional food supply chains is an important strategy to strengthen the resilience of Melbourne's food system to future shocks and stresses.[188] Resilient food systems draw on diverse sources of food – global, national and local. If one geographic area is affected by a shock, food can be sourced from other areas.[189] The COVID-19 pandemic has highlighted the risks of relying solely on long and complex supply chains (see section 2.3). Local and regional food supply chains that connect local producers more directly to consumers and businesses in Melbourne have fewer potential points for disruption.

When fresh fruit and vegetable supplies ran short in major supermarkets during the Omicron wave of the COVID-19 pandemic in Victoria, smaller scale grocers, farmers markets and other smaller stores often had good supply. Their supply chains involved fewer people and bottlenecks.[190] Grocers often pick up supply themselves from wholesale markets and farmers bring supply direct to farmers markets. Strong local supply chains can also be important if food supply routes into a city are cut off by a sudden event, such as a storm, bushfire or flood. During severe flooding in Queensland in 2010-11, when major food supply routes into Brisbane were cut, local and regional food supply chains were important in maintaining fresh food supplies. Smaller scale enterprises involved in local and regional food supply chains can also be nimble and flexible in responding to shocks, and benefit from good local knowledge and relationships.[191]

Investing in local and regional food supply chains has multiple potential co-benefits that include building local food economies and supporting new and small-scale farmers.[192] Melbourne has the advantage of being surrounded by a highly productive foodbowl with long growing seasons.[193] This foodbowl could support strong local and regional food supply chains that make an important contribution to the resilience of Melbourne's food supply. However, greater investment is needed in building local and regional food supply chains. Agriculture policy in Victoria has focused primarily on promoting large scale, export oriented agriculture.[194] A new policy focus has emerged recently on small-scale artisanal agriculture.[195] This has potential to be expanded into a new policy focus on the role of resilient local and regional food systems in COVID-19 recovery, following the example of the United States Department of Agriculture.[196]

188 Blay-Palmer, A., Santini, G., Halliday, J., Malec, R., Keller, L., Ni, J., Taguchi, M. and van Veenhuizen, R. (2021) City region food systems: Building resilience to COVID-19 and other shocks. *Sustainability* 13 (3), 1325.

189 Murphy, M., Carey, R. and Alexandra, L. (2022) *The resilience of Melbourne's food system to climate and pandemic shocks*. University of Melbourne, Australia.

190 Butler, B. (2022) How fresh food markets are avoiding Australia's crippling supply chain crisis. *The Guardian*, 15 January 2022. Available www.theguardian.com/business/2022/jan/14/how-fresh-food-markets-are-avoiding-australias-crippling-supply-chain-crisis (accessed 29 March 2022).

191 Smith, K., Lawrence, G., MacMahon, A., Muller, J. and Brady, M. (2016) The resilience of long and short food chains: a case study of flooding in Queensland, Australia. *Agriculture and Human Values* 33: 45-60.

192 Low, S., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A., Perez, A., Ralston, K., Stewart, H., Suttles, S., Vogel, S. and Jablonski, B. (2015) *Trends in U.S. Local and Regional Food Systems*, AP-068, U.S. Department of Agriculture, Economic Research Service.

193 Carey, R., Larsen, K. and Sheridan, J. (2019) *Roadmap for a resilient and sustainable Melbourne foodbowl*. University of Melbourne, Australia.

194 Carey, R., Larsen, K. and Sheridan, J. (2019) As above.

195 For example, Agriculture Victoria's small-scale and craft program. Available https://agriculture.vic.gov.au/support-and-resources/funds-grants-programs/small-scale-and-craft-program (accessed 29 March 2022).

196 USDA (2021) USDA to invest more than $4 billion to strengthen food system. Media release 8 June 2021. Available: https://www.usda.gov/media/press-releases/2021/06/08/usda-invest-more-4-billion-strengthen-food-system (accessed 30 March 2022); USDA (2022) Local food purchase assistance cooperative agreement program. USDA Agricultural Marketing Service. Available: https://www.ams.usda.gov/selling-food-to-usda/lfpacap (accessed 30 March 2022).

3.6.2 What should policy aim to achieve?

This narrative describes the outcomes that policy should aim to achieve by 2050:

In 2050, small to medium scale farms and food enterprises are thriving in Melbourne's city region and regional Victoria. The COVID-19 pandemic in 2020 marked a turning point for local and regional supply chains, as the vulnerabilities in global supply chains became evident. Investment in local and regional supply chain infrastructure and businesses enabled small-medium scale farmers to gain greater control of supply networks and to sell directly to consumers and businesses. Farmers now receive a fair price for their produce and capture a greater share of the food retail dollar.

The region comprises a diverse range of thriving farms and value-adding food businesses. Many new jobs have been created in the local food system, leading to vibrant and connected regional communities, which collaborate to develop shared solutions. Households and businesses are adept at using what is seasonally and locally available, and this has become the norm. People know and celebrate the provenance of their food, and food producers are valued. Melbourne's chefs have become renowned for their use of food from the region, and local food is widely available throughout the city.

Decentralised and diverse food supply networks are now widely recognised to increase the resilience of the food system to shocks and stresses. Small and shared processing facilities throughout Victoria enable farmers to diversify and value-add. Many farmers supply food directly to households, shops, chefs and institutions. Government institutions - such as prisons, hospitals, childcare centres and meals-on-wheels services - primarily purchase food from Victorian farmers. Farmers can access support with direct marketing and logistics, and to develop connections to local agribusiness opportunities.

3.6.3. Recommendations

1 Invest in local food processing and distribution

What

Regional infrastructure is required to support the growth of resilient processing and distribution networks. Regional infrastructure should be accessible to multiple enterprises. In many regions, farmers and food distributors are already collaborating on innovative, decentralised processing and distribution models that provide small-medium scale farmers and businesses with greater control of their supply chains.

a. **Invest in shared, decentralised infrastructure for small-medium scale local food processing and distribution**. This includes packing sheds, cool stores, artisan grain mills, boning rooms, abattoirs and small goods processing spaces. Shared refrigeration and packing spaces are important to facilitate aggregation and distribution in supply networks. Shared retail and distribution infrastructure is needed, including retail food hubs, on-farm hubs, and buyer co-operatives. Shared digital infrastructure is also needed to support decentralised logistics and retail.

b. **Establish grants schemes that provide operational and capacity building support to scale up local food processing and distribution**. Greater support is needed to move food between enterprises. Diesel rebates are available to producers for on-farm use, but not to make deliveries (e.g. by producers who distribute their own products). Grant schemes could be established to incentivise sustainable delivery vehicles, such as electric vehicles. Local food processing and distribution is also constrained by lack of human resources, so grant schemes should allow funds to be spent on staff wages, as well as infrastructure. This could include funding staff for community-led projects that aim to establish shared infrastructure for food processing and distribution.

Who

Federal, state and local government, philanthropic organisations, private capital

Why

Initiatives to establish shared infrastructure for local food processing and distribution are often constrained by lack of funding and policy support. However, supporting these initiatives can strengthen the resilience of food supply networks. Decentralised supply networks can reduce bottle necks and potential points of failure in food supply chains. Effective governance mechanisms are needed to ensure that resources are directed to initiatives that will best support farmers and food enterprises.

2 Review regulatory barriers to small-scale and artisanal food processing and distribution

What

Some existing legislation limits the diversity and resilience of local food processing and distribution. Streamlined compliance regulations are needed to enable scale-appropriate food processing and distribution for small-medium enterprises.

a. **Enable the development of small-scale food processing through scale-appropriate regulation**. Examples of scale-appropriate regulation might include changes to enable abattoirs or rural industry as a scheduled use in Farm Zones if throughput is a small number of units, so that operations can occur on-farm. It could also include streamlined compliance processes for small-scale food enterprises, such as food safety and planning compliance. The risk profile of the operation might determine the level of reporting required.

Who

State and local government

Why

Current legislation addresses issues that relate particularly to large-scale food enterprises, and it can result in a disproportionate amount of time being spent by small-medium enterprises on compliance issues that are less relevant for enterprises of their size. Reducing the regulatory burden for small-medium scale enterprises would reduce the burden on their limited resources and free up staff time for other activities.

3 Promote resilient local and regional food supply chains through planning and agriculture policy

What

Promoting strong local and regional food systems and resilient food supply chains should be a core objective of agriculture and land use planning policy in Victoria.

a. **Expand the Victorian Planning Provisions to include objectives for health and food security**

Land use planning policy could play an important role in promoting food security in Victoria by enabling land uses that promote resilient, sustainable, healthy and thriving food systems. This could include protection of the right to farm responsibly, provisions for scale-appropriate boning rooms and abattoirs on farm, and provisions for retail infrastructure to support aggregation of produce in farmgate sales (e.g. allowing farmgate shops to sell produce from other local farms to enable them to meet consumer demand for 'whole grocery' shopping, and allowing signage to promote farm shops). Land use planning in urban areas can also facilitate food distribution and retail that supports strong local and regional food systems (e.g. farmers' markets and food hubs on public land).

b. **Promote local and regional food systems in Victorian agriculture policy**

Victorian agriculture policy could support more resilient food systems by adopting the promotion of strong local and regional food systems as a clear policy aim. For example, the United States Department of Agriculture (USDA) has a goal to 'build resilient supply chains and strengthen local and regional food systems'.[197] Promoting strong local and regional food systems could have a positive flow-on effect through programs that support farmers and food enterprises, such as training, research and development, and funding. There is also an opportunity for agriculture policy in Victoria to more strongly support the aims of health policy to facilitate *equitable* food access by considering how initiatives could achieve co-benefits of improving food access for vulnerable population groups.

c. **Ensure that small-scale farmers, processors and distributors are represented in policy development processes**

There is opportunity to increase the focus on small-medium scale farmers and food enterprises across relevant policy areas. Small-medium scale farms and food enterprises are important to the resilience of Victoria's food system and the state's food supply, but they have historically been overlooked in policy initiatives in favour of a focus on large-scale enterprises. Small-medium scale farmers and enterprises are also underrepresented by levy bodies, industry bodies, and farmer groups, which often represent stakeholders in policy processes. Government could broaden its policy focus to include small-medium scale farmers and enterprises by engaging with the civil society organisations that represent these enterprises.

197 USDA (2021) *Pathways to more sustainable, resilient, and inclusive US food systems*. Available https://www.usda.gov/oce/sustainability/foodsystems/systems (accessed 19 December 2021).

Who

State government (including Agriculture Victoria), Federal and local government

Why

Land use planning policy in Victoria has a goal to protect farmland, but it has little policy focus on supporting active use of the land for food production. This narrow focus undermines the objective of protecting farmland. Land use planning policy could play a stronger role in promoting resilient, sustainable, healthy and equitable food systems by adopting a broader view of 'land use' that also considers the many ways in which land use impacts food systems and supply chains. Agriculture policy in Victoria has historically had a relatively narrow focus on promoting large-scale export-oriented agriculture and has neglected the important role of small-medium scale farmers and food enterprises in resilient food systems. The 2021 UN Food Systems Summit[198] has increased policy focus on food systems globally, but the state's policy frameworks currently lack a focus on food systems with no government department having clear overarching responsibility for 'food'.

4 Support the development of decentralised logistics and marketing schemes

What

What: Provide funding to small-medium scale enterprises to develop and scale models for decentralised logistics and marketing schemes that promote resilient, sustainable, healthy and equitable food systems.

a. **Support small-medium scale farmers and food enterprises to develop alternative sales channels and products.**

Grant programs for food enterprises should include a focus on small-medium scale enterprises that can deliver innovative sales channels and products that strengthen local and regional food systems. Funding programs should support collaborative approaches, rather than single-enterprise solutions, and should encourage the involvement of farmers in co-designing solutions that are responsive to their needs. Funding programs should also be available to successful existing enterprises that aim to scale up, expand to new regions or meet newly identified needs.

Who

State and local government

Why

There is a need to build strong local and regional food supply chains by promoting collaboration between small-medium scale enterprises and farmers. There is also a need to support projects at the early stages of their development to ensure that they are incubated successfully.

5 Introduce provenance labelling to promote local and regional food products

What

Provenance labelling should be introduced for food produced in Victoria, and marketing campaigns should encourage consumers to buy food from Victorian farmers. Community education and marketing that highlights the benefits of buying sustainably produced food could also influence purchasing behaviour.

198 See https://www.un.org/en/food-systems-summit

a. **Support provenance labelling for food products.** Promote Victorian food products through labelling and marketing that complements Australia-wide Country of Origin labelling. Provenance labelling could also be extended to fresh and loose produce.

b. **Advocate for strong sustainable and regenerative farming standards** to be adopted in the Agricultural Farm Biodiversity Certification Scheme. Food produced using sustainable farming approaches should be appropriately labelled and marketed to inform consumers about its environmental benefits.

Who

State government, federal government, industry bodies

Why

It is currently difficult for consumers to identify food that has been produced in Victoria, and there is a need for state-wide provenance labelling to make it easier for consumers to choose to buy food from Victorian food producers. There is also a need to encourage consumers to buy food that has been produced sustainably.

6 Strengthen government food procurement standards to give preference to Victorian produce and to pay farmers a fair price

What

Government food purchasing for institutions such as prisons, hospitals, childcare centres and meals-on-wheels services can strengthen local and regional food supply chains. There are a range of public health, economic and social benefits that can be realised by prioritising purchasing from local producers.

a. **Introduce Victorian and local government food procurement standards that preference regional food producers**. Purchasing guidelines should be developed that require government-funded institutions to consider preferencing food from Victorian farmers in purchasing decisions, alongside procurement standards for healthy and sustainable food e.g. if a bid from a local producer falls within a specific percentage of the lowest priced bid.

b. **Ensure that government food procurement schemes enable the participation of small-scale farms through aggregation of supply.** Enable small-medium scale farmers and enterprises to participate in government food procurement processes by facilitating aggregated bids and by purchasing from aggregators, such as food hubs. Match smaller government food purchasing needs to small-medium enterprises to open up government food procurement to producers who have lower volumes of supply.

Who

Federal, state and local government

Why

Government food procurement standards are a powerful way to stimulate the market for healthy and sustainably produced local food and can have significant impacts on outcomes for Victorian farmers and food enterprises.

3.6.4. Potential enablers and barriers to implementing the recommendations

Stakeholders identified a range of potential barriers and enablers to implementing these recommendations:

Enablers

- Funding – the availability of grants, investment and philanthropic support is a key enabler for innovative initiatives that strengthen local and regional food systems. Funding is needed to support infrastructure, transport, and resources for small-medium scale enterprises across all components of local and regional food supply chains.
- Scale-appropriate support can promote diverse and resilient food supply networks. This can include funding opportunities for small-scale enterprises or for collaborative endeavours.
- Supportive policy – Policy can play a significant role in building resilient local and regional food supply chains or networks by supporting the efforts of innovative small-medium scale enterprises to establish new models of food processing, distribution and retail.
- Collective will and collaborative energy – strong local and regional food systems thrive on an abundance of collective will and energy. Governments can support the development of collective energy by providing collaborative (rather than single enterprise) funding opportunities.

Barriers

- Access to scale-appropriate, affordable infrastructure – a resilient food supply relies on a network of infrastructure, from abattoirs and packing sheds to cold stores, retail and distribution. There is a lack of infrastructure to support small-medium scale farmers and food enterprises in Victoria. Infrastructure should be affordable, available for use by multiple enterprises, and appropriate for small-medium scale enterprises.
- Regulation can impede the development of resilient, decentralised food supply networks because the reporting burden has a disproportionate impact on small-medium size farms and enterprises.
- Lack of resources – Inadequate development of infrastructure to support local and regional food supply chains is often linked to a lack of financial resources. In other cases, innovative small-medium scale enterprises are constrained in their delivery by a lack of human resources. The lack of time and capacity to deliver innovation in supply chains is a limiting factor.

Right: Image courtesy of Food Connect Shed

Food Connect Shed: a community-owned food hub in Brisbane

The Food Connect Shed in Brisbane is a multi-purpose community-owned food hub that includes a commercial kitchen, offices and event space.[199] The Food Connect Shed is home to around 20 local food businesses that benefit from access to shared infrastructure. This includes kitchen space, cold storage, freezers, specialised kitchen equipment and loading bays for distribution. Accessing these facilities and storage spaces helps new businesses to save money in their early years, and to build connections with like-minded ethical food entrepreneurs. It also enables them to source produce from local growers, who are part of Food Connect's community supported agriculture initiative.[200]

The Food Connect Shed was funded through an equity crowdfunding campaign and is co-owned by over 500 different shareholders in the local community, over 75% of whom are women. Co-owning the property allows growers in the area to feel secure in their access to the local market and provides long-term workspaces for small food businesses to grow. This shared, community-owned commercial kitchen model promotes decentralised small-scale food processing and bolsters the long-term success of small and medium-sized local food businesses in the Brisbane area.

199 See www.foodconnectshed.com.au/

200 Wilson, C. (2020) *Social enterprise Food Connect links small farms and market gardens with city consumers.* ABC News Australia. 24 September 2020 Available www.abc.net.au/news/2020-09-24/social-enterprise-food-connect-connects-farmers-and-consumers/12697426 (accessed 4 April 2022).

Building resilience through small-scale regional food processing

Establishing small-scale food processing facilities in regional areas can strengthen the resilience of food supply chains. Small-scale abattoirs are becoming more common in regional Victoria and NSW. One example is Provenir, which is the first mobile abattoir in Australia. Provenir buys grass-fed beef cattle from farmers in Victoria and NSW, and slaughters them on farm to reduce the stress for animals and to improve the quality of the meat.[201] Before Provenir could operate its mobile abattoirs, legislation had to be changed in the states in which it operates to allow vehicles to be licensed as abattoirs.

Micro-dairies are also becoming more prominent in Australia and around the world, such as the Sellar Farmhouse Creamery in Victoria, and Pines micro-dairy and Ewetopia in NSW. These dairies process the milk that they produce on farm, enabling them to sell direct to consumers and to gain a greater share of the food dollar.[202] On-farm processing is also becoming more common in horticulture. GP and SJ Daly, a small family-owned potato farm in Tasmania, built on-site processing facilities to convert surplus potatoes into salads with help from the Australian government's Entrepreneur's Programme.[203] This enabled them to add value to their products, expand their business, and reduce food waste. Food and Fibre Gippsland is also working on a project to create a regional vegetable processing facility that would give Gippsland growers an avenue to convert produce that would otherwise be lost into higher value products.[204]

201 See https://provenir.com.au/about/

202 Clifford, J. and Cavanagh, M. (2019) *Boutique dairies on the rise, as farmers look to process their own produce and set prices*. ABC News Australia 30 June 2019 Available www.abc.net.au/news/2019-06-30/micro-dairies-increase-as-farmers-move-to-independent-processing/11247842 (accessed 4 April 2022).

203 Australian Government (2020) *GP & SJ Daly- digging up new products for family potato farm*. Available https://business.gov.au/grants-and-programs/entrepreneurs-programme/customer-stories/gp-and-sj-daly (accessed 4 April 2022).

204 Food and Fibre Gippsland (2021) *Smart Specialisation – Advanced Vegetable Processing*. Available www.foodandfibregippsland.com.au/smart-specialisation (accessed 4 April 2022).

3.7 Sustainable livelihoods

3.7.1. Introduction

Strengthening the resilience of Melbourne's food system is inextricably linked to building sustainable livelihoods for farmers and workers throughout the food system. Livelihoods comprise "people, their capabilities and their means of living, including food, income and assets".[205] A sustainable livelihood enables people to cope with and recover from shocks and stresses and to maintain or enhance their capabilities and assets now and into the future.[206]

For farmers, this means receiving a farmgate price that enables them to make a sustainable living. A Senate Inquiry into the performance of Australia's dairy industry found that increases in milk prices did not keep up with the cost of production[207] and that this was compounded by climate volatility, including bushfires and drought.[208] The livelihoods of food industry workers also need to be improved with a living wage and safe and secure working conditions. The policy challenge is to support sustainable livelihoods for farmers and food workers, while ensuring food security for all.

3.7.2. What should policy aim to achieve?

This narrative describes the outcomes that policy should aim to achieve by 2050:

In 2050, jobs in the food and agriculture sector are highly sought after and livelihoods are sustainable. Workers throughout the food system enjoy fair, safe and secure working conditions. They have good wages and career prospects. In the 2020s, government, industry, and civil society worked together to transform the sector, enabling a more secure agricultural workforce. Many local jobs were created during a local and regional food economy boom in the 2020s and 2030s. A range of social enterprises, community and industry organisations provide multiple economic and social benefits, creating employment pathways for disadvantaged and vulnerable populations.

Training and employment programs and pathways are readily accessible and enjoy high rates of participation. They offer hands-on and theoretical learning through mentorships, apprenticeships and tertiary degrees. People throughout the food supply chain can access lifelong learning opportunities. They have specialist technical and practical knowledge and a sound understanding of the complex interactions of natural resource management and food production. A range of support exists for new and aspiring farmers to access land, capital and networks, including farmer incubation programs.

Left: Image courtesy of Provenir

205 Chambers, R. and Conway, C. (1992) *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. IDS Discussion Paper 296. Brighton, UK.

206 Chambers, R. and Conway, C. (1992) As above.

207 The Senate Rural and Regional Affairs and Transport References Committee (2021) *Performance of Australia's dairy industry and the profitability of Australian dairy farmers since deregulation in 2000*. Canberra, Australia.

208 See Australian Dairy Farmers, Australian Dairy Products Federation, Dairy Australia and Gardiner Dairy Foundation (2020) *Australian Dairy Plan 2020–2025*, Melbourne, Australia.

3.7.3. Recommendations

1 Promote compliance with fair and safe work conditions and provide a living wage for workers throughout the food system

What

Implement initiatives to improve working conditions across the food system and to support sustainable livelihoods among workers and producers.

a. **Implement recommendations from the *National Agricultural Workforce Strategy***[209] to improve working conditions by regulating labour hire and by strengthening initiatives such as *Fair Farms*[210] that work with growers to increase compliance with workplace regulations.

b. **Raise awareness and support among consumers for fair working conditions throughout the food system.** Consumers can play a role in challenging exploitation through a demand-led focus on ethical sourcing, and by linking consumers with ethical growers and vendors. The Harvest Trail Inquiry found that 72% of consumers believed that the government should ensure farm workers are paid correctly and 63% of consumers surveyed also expected supermarkets to take responsibility.[211]

Who

Federal government, Fair Work Commission, industry organisations, unions

Why

Industries across the food system – from production, processing and distribution to retail and hospitality – have a high degree of casualised labour, low rates of pay and poor working conditions.[212,213] More than half of the seasonal harvesting workforce in horticulture are temporary migrant workers and piece-rates are common, which leaves them vulnerable to exploitation.[214] The underlying drivers of exploitation in the horticulture industry include unethical labour hire contractors and segmentation of the labour market, which drives down conditions across the workforce.[215,216] In the food service sector, almost two-thirds of workers are casually employed (64%),[217] and work is often underpaid and in breach of labour regulations. The coronavirus pandemic caused disruption and labour shortages across all parts of the food system, from food production through to food retail.[219]

209 Azarias, J., Nettle, R. and Williams, J. (2020) *National Agricultural Workforce Strategy: Learning to excel*, National Agricultural Labour Advisory Committee, Canberra, Australia CC BY 4.0. Available: https://www.awe.gov.au/agriculture-land/farm-food-drought/agricultural-workforce/naws (accessed 26 April 2022).

210 See https://fairfarms.com.au/

211 Fair Work Ombudsman (2018) *Harvest Trail Inquiry: A report on workplace arrangements along the Harvest Trail*. Commonwealth of Australia.

212 Fair Work Commission (2021) *Decision – Application to vary the Horticulture Award 2021*, AM2020/104. Commonwealth of Australia.

213 DEDJTR (2016) *Victorian Inquiry into the Labour Hire Industry and Insecure Work – Final Report*. Department of Economic Development, Jobs, Transport & Resources. Melbourne, Australia.

214 Fair Work Commission (2021) As above.

215 Howe, J., Clibborn, S., Reilly, A., Broek, D. and Wright, C. (2019) *Towards a durable future: tackling labour challenges in the Australian horticulture industry*. University of Adelaide, Australia.

216 Azarias, J., Nettle, R. and Williams, J. (2020) As above.

217 Gilfillan, G. (2020) COVID-19: *Impacts on casual workers in Australia – a statistical snapshot*. Parliament of Australia

218 Berg, L., and Farbenblum, B. (2017) *Wage Theft in Australia: Findings of the National Temporary Migrant Work Survey*. University of New South Wales, Australia.

219 Jones, N., Bellamy, J., Bellotti, W., Ross, H., van Bommel, S. and Lu, Y. (2022) A shock to the system: What the COVID-19 pandemic reveals about Australia's food systems and their resilience. *Frontiers in Sustainable Food Systems* 5: 790694

2 Provide diverse career and training pathways in the food and agriculture industries

What

Entry points into the food and agriculture industries, and training and career pathways, should meet the needs of a diverse workforce. They should also reflect the diversity of enterprises in these industries. More training opportunities, informal education pathways, and skilled graduates are required.

a. **Support life-long learning pathways** in the agri-food industries, including pathways tailored to First Nations and CALD populations. These pathways should recognise varied types of training and education, from short courses to degrees. They should also recognise volunteering, mentoring and internship experiences. Training should be tailored to specific industries and types of production, including sustainable and resilient productions systems (e.g. closed loop protected agriculture and regenerative agriculture). Opportunities should be available for people at different career stages.

b. **Create job-ready training opportunities in agriculture and food** through collaboration between training providers and the agri-food industries. Training providers could collaborate closely with the agriculture and food sectors to create a wide range of job-ready training courses that provide trainees with the skills and experience to take advantage of opportunities in industry growth areas.

c. **Fund social enterprises that work with vulnerable communities** to provide training and employment services in food and agriculture. This could include networked employment pathways across the social enterprise sector to enable trainees to access a range of work experience and learning opportunities. A network of social enterprise organisations is required to connect businesses providing job placement opportunities. The social enterprise sector is a sector of small enterprises that needs aggregation functions to help connect it and enable scaling.

Who

Industry, government, social enterprises, education and training organisations

Why

There are many types and scales of agriculture and food enterprises from small family-owned businesses to large corporations. However, the industry is hampered by workforce challenges and labour shortages, and it lacks a unifying vision for training and education. There are opportunities to strengthen the participation of First Nations and CALD communities in the food and agriculture industry through training and education. In the agriculture workforce, only one per cent identified as Aboriginal or Torres Strait Islander, while 11% were from CALD backgrounds.[220]

3 Support the growth and development of a regional agricultural workforce through housing provision

What

Provide adequate housing for the agriculture workforce in rural and regional areas.

a. Provide housing subsidies, rebates, and services to agricultural workers to relocate to regional areas. New Commonwealth and relocation subsidies were introduced in 2021 to address seasonal workforce shortages due to COVID-19.

220 Binks, B., Stenekes, N., Kruger H., and Kancans, R. (2018) *Snapshot of Australia's Agricultural Workforce*. Australian Bureau of Agricultural and Resource Economics, Commonwealth of Australia.

b. Develop accommodation plans for regional areas to ensure that sufficient accommodation is available. The first step is to bring local government, state government, industry, and civil society organisations together to audit accommodation needs in an area. Recent changes to the Victorian Planning Provisions allow farm businesses to build accommodation on-farm for up to 10 agricultural workers without requiring a planning permit, removing one barrier to providing accommodation for agricultural workers.[221]

Who

Federal government, state government, local government, industry, civil society organisations

Why

Provision of adequate housing for the agriculture workforce is a key constraint on growth of the industry in rural and regional areas. Agricultural workers are less able to relocate to a region on a permanent basis or temporarily during harvest, if there is insufficient housing or services such as transport, education and health. Substandard, overcrowded, and high cost accommodation is a barrier to attracting and retaining workers in the industry.[222] Precarious living conditions and accommodation are common for temporary migrant workers in horticulture, who include backpackers, international students, and labourers from the Pacific.[223]

4 Support new and aspiring farmers to access land, training and capital

What

Provide new and aspiring farmers with support to overcome barriers to entering the industry. Targeted programs can respond to locally identified needs and ensure that agricultural land remains productive.

a. **Support access to land for new and aspiring farmers** through a range of mechanisms, such as land-share arrangements, collaborative farming, and succession planning. Support could include:

- farmer incubator programs that provide land and shared infrastructure
- creating land share registries or matching services
- facilitating agreements for use of private land by new farmers
- increasing use of public land by community and social enterprises to support new farmers

b. **Fund networking, training and mentoring programs** for new farmers, and strengthen links between training providers and farm businesses to provide hands on learning opportunities.

c. **Provide opportunities for new farmers to access capital.** Support could be provided through HECS-style loans, community farmland trusts, worker co-operatives and finance mechanisms that support shared land ownership. Long-term models of access (e.g. land trusts and co-operatives) overcome potential issues associated with short-term leases that may limit investment.

Who

Government, philanthropy, industry

221 See www.planning.vic.gov.au/latest-news/rural-worker-accommodation-changes (accessed 1 April 2022).

222 Fair Work Ombudsman (2018) *Harvest Trail Inquiry: A report on workplace arrangements along the Harvest Trail*. Commonwealth of Australia.

223 Barry, K. (2019) Momentarily immobile: Backpacking, farm work, and hostels in Bundaberg, Australia, *Geographical Research* 59 (1): 46-55.

Why

New and aspiring farmers face many barriers. It is difficult for new farmers to begin farming in Melbourne's foodbowl due to high land prices, lack of opportunities to gain experience, and a lack of on-going mentoring and support. It is particularly difficult for new farmers from non-farming families, who don't have an existing family connection to land. It can also be difficult for retiring farmers to put succession plans in place when there is no family member to take over the farm. New approaches are needed to keep farmland in Melbourne's foodbowl productive.

3.7.4. Potential enablers and barriers to implementing the recommendations

Stakeholders identified a range of potential barriers and enablers to implementing these recommendations:

Enablers

- Adopting a 'whole of food system' approach will support implementation of recommendations across the food system from production through to retail, consumption and recycling.
- Coordination and collaboration across levels of government and across sectors – including industry, civil society and community - can provide local solutions to local needs.
- Consumers can be engaged to increase awareness of the need for fair working conditions and create demand for change.
- The pandemic focused attention on workforce and labour issues. There are opportunities to tap into new funding, policy, and initiatives to transform and create sustainable livelihoods.

Barriers

- Monitoring and enforcement of workforce regulations and policies is required. New initiatives to eliminate unethical operators and modern slavery require active monitoring and penalties for non-compliance.
- Historically, there has been a focus in agriculture policy at state and federal level on large scale export-oriented agriculture. Policy support for small- to medium-scale farms, which comprise many of the farms in Melbourne's foodbowl, has been limited.
- Access to peri-urban farmland has had a cultural bias against new farmers, and it is more difficult for migrant, refugee and female farmers to access land.

Supporting new farmers in the United States

In the United States, there are many government-led programs to support young and new farmers. The United States Department of Agriculture's (USDA) *Beginning Farmer and Rancher Development Program* funds farmer extension and education organisations to provide mentoring and training to new farmers.[224] Funded programs provide a range of services to farmers through regional training hubs, continuing education programs and online education. The USDA also offers loans to new farmers and ranchers, which can be used to purchase land or support farm businesses during their startup years.[225,226]

Another program to support new farmers in the United States is the *National Incubator Farm Training Initiative* (NIFTI), run by New Entry, an initiative of Tufts University.[227] Farmer incubators provide new farmers with access to small parcels of land, infrastructure and training. Since 2012, NIFTI has been providing technical assistance, educational resources and professional development to farmer incubator programs across the US. Most of NIFTI's services are free, and include an annual farm incubator field school, online resources, webinars and one-on-one assistance for incubator farms.

One of the most significant issues facing new farmers is access to land. The USDA's *Conservation Reserve Transition Incentive* program supports new or socially disadvantaged farmers to access land in the nation's Conservation Reserve Program, a conservation program for privately held land. The USDA provides financial incentives to encourage retiring landowners to sell farmland in the program to new and socially disadvantaged farmers, and gives new farmers priority to purchase farmland at its appraised value.[228]

224 United States Department of Agriculture (2018) *Beginning Farmer and Rancher Development Program*. Available https://nifa.usda.gov/funding-opportunity/beginning-farmer-and-rancher-development-program-bfrdp (accessed 22 April 2022).

225 USDA Farm Service Agency (2021) *Beginning Farmers and Ranchers Loans*. Available www.fsa.usda.gov/programs-and-services/farm-loan-programs/beginning-farmers-and-ranchers-loans/index (accessed 4 April 2022).

226 Australian Government Regional Investment Corporation (2021) *AgriStarter Loans*. Available www.ric.gov.au/agristarter (accessed 4 April 2022).

227 New Entry Sustainable Farming Project (2012) *National Incubator Farm Training Initiative*. Available https://nesfp.org/NIFTI (accessed 4 November 2021).

228 USDA Farm Service Agency (2021) *Transition Incentives Program*. Available www.fsa.usda.gov/programs-and-services/conservation-programs/transition-incentives/index (accessed 4 November 2021).

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SECTION 4

4 Conclusion

4 Conclusion

Melbourne's food system has been affected by several significant shocks in recent years, including the 2019-2020 bushfires, which affected food production in parts of Victoria, and the COVID-19 pandemic. These shocks have revealed vulnerabilities in the city's food system, but they have also created an opportunity to address them to increase the resilience of the city's food system to future shocks.

Shocks to our food system will occur more frequently in future, and there will be compounding effects when several shocks co-occur or follow closely on each other.[229] These shocks and underlying constraints on the availability of natural resources are likely to drive up food prices. As food prices rise, it will have the greatest impact on vulnerable members of the community who are already at risk of food insecurity.

There is a need for all levels of government to develop food resilience plans, which identify actions that will be taken to strengthen the resilience of the region's food system to future shocks and stresses. This report has outlined strategies that could inform these actions. The strategies have been co-developed by a wide range of stakeholders from government, industry and civil society.

Food resilience plans should be underpinned by a commitment at all levels of government to ensure that citizens can realise their human right to food through dignified access to adequate food that is healthy, culturally appropriate and produced in ways that are sustainable, ensuring the right to food for future as well as current generations.[230]

Food resilience plans should be developed using an integrated 'food systems' approach that takes account of the many decisions and policy portfolios that influence the resilience of food systems and should aim to achieve healthy, equitable and sustainable food systems in addition to strengthening resilience. These plans should place the food sovereignty of the region's First Nations peoples at their core and should recognise their role as Traditional Custodians of the land, waterways and biodiversity that underpin our food system and their deep knowledge of how to produce food in ways that can sustain and regenerate our natural ecosystems.

Food resilience plans should also be developed in ways that invite people to contribute to shaping their food system as active food citizens. The voices of citizens with lived experience of food insecurity should receive particular attention.

The recent experience of the COVID-19 pandemic and climate shocks on the region's food system present an opportunity to harness the lessons learned and to build on the adaptation and innovation that has already begun. This roadmap points the way to ensuring that everyone in the region has access to healthy and sustainably produced food, even through future shocks and stresses.

Left: pexels.com/Wolfgang Borchers

229 IPCC (2022) As above.

230 De Schutter, O. (2014) *Final Report: The transformative potential of the right to food*. Presented to the 25th Session of the UN Human Rights Council, United Nations General Assembly.

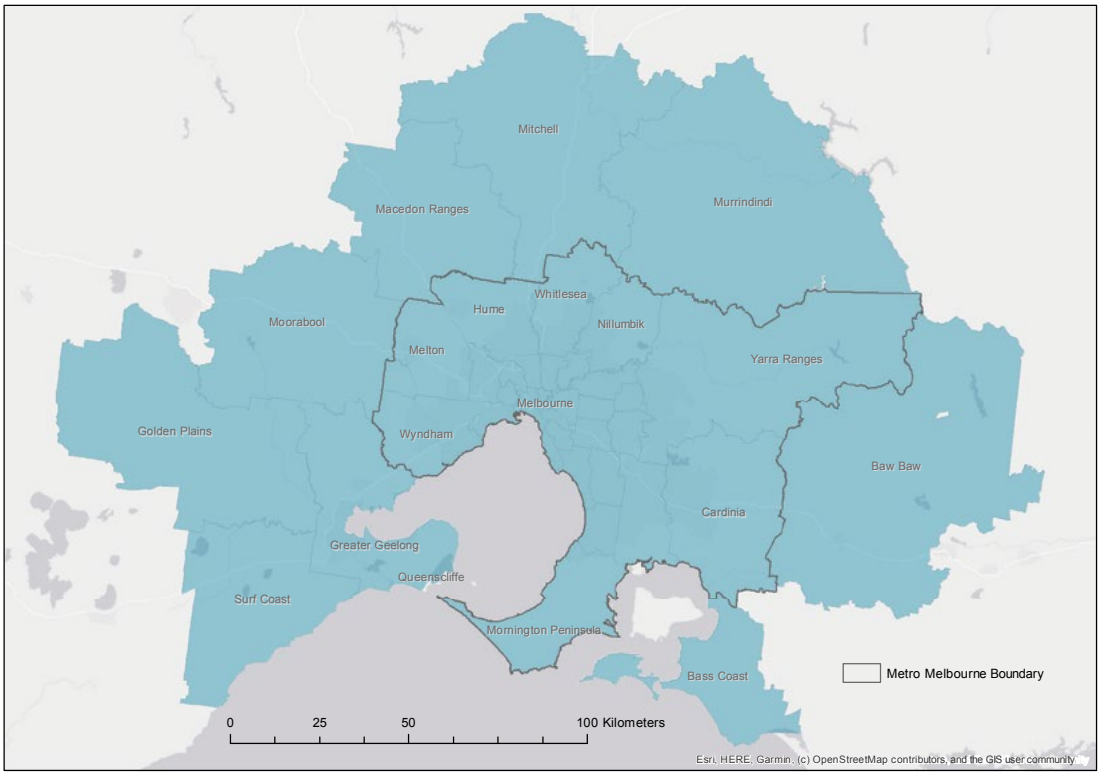
Appendix A

Local government areas included in Melbourne's city region

Melbourne's city region food comprises 40 local government areas of Greater Melbourne and the surrounding peri-urban areas within approximately 100 km of central Melbourne. The municipalities are:

Banyule City Council
Bass Coast Shire Council
Baw Baw Shire Council
Bayside City Council
City of Boroondara
Brimbank City Council
Cardinia Shire Council
City of Casey
City of Darebin
Frankston City Council
City of Greater Geelong
Glen Eira City Council
Golden Plains Shire Council
City of Greater Dandenong
Hobsons Bay City Council
Hume City Council
City of Kingston
Knox City Council
Macedon Ranges Shire Council
Manningham Council
Maribyrnong City Council
Maroondah City Council
City of Melbourne
City of Melton
Mitchell Shire Council
City of Monash
City of Moonee Valley
Moorabool Shire Council
Moreland City Council
Mornington Peninsula Shire
Murrindindi Shire Council
Nillumbik Shire Council
City of Port Phillip
Stonnington City Council
Surf Coast Shire
Whitehorse City Council
City of Whittlesea
Wyndham City
City of Yarra
Yarra Ranges Council

Map of Melbourne's city region



Appendix B

Foodprint Melbourne project partners

The Foodprint Melbourne project partners are:

University of Melbourne

Lord Mayor's Charitable Foundation

Cardinia Shire Council

City of Melbourne

City of Whittlesea

Interface Councils

Foodbank Victoria

Mornington Peninsula Shire

Moreland City Council

Open Food Network

Peri-urban Group of Rural Councils

Port Phillip and Westernport Catchment Management Authority

Victorian Council of Social Service

Wyndham City

LORD MAYOR'S CHARITABLE FOUNDATION

THE UNIVERSITY OF MELBOURNE