



# Supplementary material: sources for infographics

No single data-driven indicator can perfectly capture each of the five focus areas. As such, this report has collected and analysed several quantitative indicators to illustrate and support the narrative in each focus area. However, it is also important that these statistical metrics do not overwhelm or overcomplicate the roadmap structure. As such, these have been incorporated into discrete infographics that are presented at the start of each focus area chapter.

The table below provides list of indicators included in the Roadmap infographics across the five focus areas, with an emphasis on the availability, quality, and recency of data for Australia. These indicators are drawn from existing food systems databases (such as the GAIN and John Hopkins University Food Systems Dashboard<sup>1</sup>) and a wide range of international and Australian-specific sources.

INDICATOR	SOURCE	ADDITIONAL COMMENTARY
<b>Focus Area 1: Enabling equitable access to healthy and sustainable diets</b>		
<b>Average distance to supermarket in Australian capital cities</b>	Australian Urban Observatory (2020) Liveability Report for Adelaide; Australian Urban Observatory (2020) Liveability Report for Brisbane; Australian Urban Observatory (2020) Liveability Report for Canberra; Australian Urban Observatory (2020) Liveability Report for Darwin; Australian Urban Observatory (2020) Liveability Report for Hobart; Australian Urban Observatory (2020) Liveability Report for Melbourne; Australian Urban Observatory (2020) Liveability Report for Perth; Australian Urban Observatory (2020) Liveability Report for Sydney.	Average distance to any supermarket in Australian capital cities, calculated from individual dwellings using pedestrian accessible road networks.
<b>Cost of foodborne illness</b>	ANU (2022) The annual cost of foodborne illness in Australia.	FSANZ commissioned the Australian National University to generate a cost model for estimating the costs of foodborne gastroenteritis and ten other pathogens.

1 GAIN and John Hopkins (2023) Food Systems Dashboard. < <https://www.foodsystemsdashboard.org/> > (accessed 16 January 2023).

INDICATOR	SOURCE	ADDITIONAL COMMENTARY
<b>Dietary risk and disease</b>	Australian Institute of Health and Welfare (2021) Australian Burden of Disease Study 2018: Interactive data on risk factor burden. < <a href="https://www.aihw.gov.au/reports/burden-of-disease/abds-2018-interactive-data-risk-factors/contents/dietary-risk-factors">https://www.aihw.gov.au/reports/burden-of-disease/abds-2018-interactive-data-risk-factors/contents/dietary-risk-factors</a> > (accessed 16 January 2023).	Due to the complex relationships and interactions between risk factors, individual dietary risks cannot be summed together and instead a combined dietary estimated was calculated by the AIHW.  These estimates reflect the amount of disease burden that could have been avoided if all people in Australia ate a healthy diet (as defined by the Australian Government’s dietary guidelines) and is measured in terms of association with disability-adjusted life years (DALYs).
<b>Proportion of packaged food and drinks that display the Health Star Rating</b>	Heart Foundation (2020) Comparison of eligibility of Health Star Rating (HSR) products, Year 5 and Year 6.	Analysis of the Health Star Rating system using the food nutrient database FoodTrack developed by The Heart Foundation in conjunction with CSIRO.
<b>Number of TV ads for discretionary vs healthy food</b>	Smithers, L, Haag, D, Agnew, B, Lynch, J, Sorell, M (2017) Food advertising on Australian television: Frequency, duration and monthly pattern of advertising from a commercial network (four channels) for the entire 2016. Journal of Paediatrics and Child Health 54(9).	Analysis of 30,000 hours of television collected in Adelaide during 2016 from one network with four channels. The Australian Guide to Healthy Eating was used to identify discretionary foods.
<b>Inadequate fruit and vegetable consumption</b>	Australian Institute of Health and Welfare (2019) Poor diet. AIHW, Australian Government.	Based on results from ABS National Health Survey (NHS) 2017–18, collected between July 2017 to June 2018.
<b>Prevalence of moderate and severe food insecurity</b>	Foodbank (2022) Foodbank Hunger Report 2022.	Based on survey data conducted in July 2022 across over 4,000 Australians.
<b>Focus Area 2: Reducing waste and improving circularity</b>		
<b>Australian total and per capita food waste</b>	FIAL (2021) National Food Waste Strategy Feasibility Study – Final Report.	The FIAL data used was collated from existing studies compiling 2018-2019 data and supplemented by additional data from stakeholder engagement with industry and household food waste audits in 2020.
<b>Climate resilient water sources</b>	Bureau of Meteorology (2023) Climate Resilient Water Sources. < <a href="http://www.bom.gov.au/water/crews/">http://www.bom.gov.au/water/crews/</a> > (accessed 16 January 2023).	The BOM climate resilient water sources dataset provides information on two of the most significant climate resilient water sources: desalination and water recycling.
<b>Food production losses pre-retail</b>	CSIRO (2019) Mapping of Australian fruit and vegetable losses pre-retail.	Based on a national food loss survey in the horticultural supply chain undertaken in 2017–18.
<b>Packaging waste</b>	Australian Packaging Covenant Organisation (2023) Australian Packaging, Consumption and Recycling Data 2020–21.	Data was collected through national surveys of packaging manufacturers, Importers and reprocesses and analysis of trade data.
<b>Recycling rate of organic material</b>	Blue Environment (2020) National Waste Report 2020.	Most of the data was obtained from state and territory governments.

INDICATOR	SOURCE	ADDITIONAL COMMENTARY
<b>Focus Area 3: Facilitating Australia's transition to net zero emissions</b>		
<b>Greenhouse gas emissions from Australia's food system activities</b>	FAO (2023) FAOSTAT: Emissions Total. < <a href="https://www.fao.org/faostat/en/#data/GT">https://www.fao.org/faostat/en/#data/GT</a> > (accessed 16 January 2023).	Emissions are calculated based on data from the UN Statistical Division (UNSD), the International Energy Agency (IEA) and other sources.
<b>Greenhouse gas emissions from Australia's food systems per capita (2020)</b>	FAO (2023) FAOSTAT: Emissions Total. < <a href="https://www.fao.org/faostat/en/#data/GT">https://www.fao.org/faostat/en/#data/GT</a> > (accessed 16 January 2023); ABS (2022) National, state and territory population. < <a href="https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2022">https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2022</a> > (accessed 16 January 2023).	Emissions for the agri-food system reported by the FAO divided by Australia's population in 2020.
<b>Per capita greenhouse gas emissions of food consumption</b>	Ridoutt, B, Baird, D, Hendrie, GA (2021) Diets within environmental limits: The climate impact of current and recommended Australian diets. <i>Nutrients</i> 13(4).	Dietary intake data were obtained from the National Nutrition and Physical Activity Survey component of the Australian Health Survey.
<b>Renewable energy usage in food and beverage manufacturing</b>	Department of Climate Change, Energy, the Environment and Water (2022) Australian Energy Statistics, Table H: Australian total final energy consumption, by industry, by fuel, energy units.	Data on food and beverage sector energy consumption also includes textile manufacturing.
<b>Focus Area 4: Aligning resilience with socioeconomic and environmental sustainability</b>		
<b>Agricultural land change during the last ten years</b>	FAO (2023) FAOSTAT: Land use. < <a href="https://www.fao.org/faostat/en/#data/RL">https://www.fao.org/faostat/en/#data/RL</a> > (accessed 16 January 2023).	CSIRO Futures estimation of agricultural land use change from 2010 to 2020.
<b>Agricultural water withdrawal as percentage of total renewable water resources</b>	FAO (2020) AQUASTAT - FAO's Global Information System on Water and Agriculture. < <a href="https://www.fao.org/aquastat/en/databases/">https://www.fao.org/aquastat/en/databases/</a> > (accessed 16 January 2023).	Custom data extraction from country statistics from AQUASTAT.
<b>Soil health</b>	Australia State of the Environment (2021) Soil Health. < <a href="https://soe.dcceew.gov.au/land/environment/soil#soil-health">https://soe.dcceew.gov.au/land/environment/soil#soil-health</a> > (accessed 16 February 2023).	Assessed out of a ranking of "very poor", "poor", "good", and "very good". Based on a range of soil health assessments conducted for intensive and extensive land use zones in Australia, as well as relatively natural zones.
<b>Average proportion of natural vegetation embedded in agricultural lands</b>	GAIN and John Hopkins University (2023) Food Systems Dashboard: Average proportion of natural vegetation embedded in agricultural lands. < <a href="https://www.foodsystemsdashboard.org/indicators/average-proportion-of-natural-vegetation-embedded-in-agricultural-lands/map">https://www.foodsystemsdashboard.org/indicators/average-proportion-of-natural-vegetation-embedded-in-agricultural-lands/map</a> > (accessed 16 January 2023).	A custom calculation provided by the Food Systems Dashboard on natural and seminatural vegetation embedded in croplands around the world.
<b>Biodiversity Habitat Index</b>	Yale Center for Environmental Law & Policy (2022) Environmental Performance Index – Biodiversity Habitat Index. < <a href="https://epi.yale.edu/epi-results/2020/component/bhv">https://epi.yale.edu/epi-results/2020/component/bhv</a> > (accessed 16 January 2023).	Estimates the effects of habitat loss, degradation, and fragmentation on the expected retention of land-based biodiversity. Based on CSIRO calculations from remote sensing data and ecological diversity studies.

INDICATOR	SOURCE	ADDITIONAL COMMENTARY
<b>Biosecurity score</b>	Global Health Security Index (2021) 2021 GHS Index Country Profile for Australia. < <a href="https://www.ghsindex.org/country/australia/">https://www.ghsindex.org/country/australia/</a> > (accessed 16 January 2023).	The GHS is a data-driven assessment and benchmarking framework for health security and related capabilities across 195 countries.
<b>Climate Risk Index</b>	Germanwatch (2019) Global Climate Risk Index 2020: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2018 and 1999 and 2018.	The index analyses to what extent countries and regions have been affected by impacts of weather-related loss events (e.g., storms, floods, and heatwaves).
<b>Fertiliser consumption</b>	World Bank (2023) Fertilizer consumption (kilograms per hectare of arable land). < <a href="https://data.worldbank.org/indicator/AG.CON.FERT.ZS">https://data.worldbank.org/indicator/AG.CON.FERT.ZS</a> > (accessed 16 January 2023).	CSIRO Futures analysis of the most recent World Bank data for Australia and OECD countries.
<b>Native vegetation extent and condition</b>	Australia State of the Environment (2021) Native vegetation. < <a href="https://soe.dceew.gov.au/land/environment/native-vegetation">https://soe.dceew.gov.au/land/environment/native-vegetation</a> > (accessed 16 February 2023).	Assessed out of a ranking of “very poor”, “poor”, “good”, and “very good”. Based on vegetation assessments conducted for intensive and extensive land use zones in Australia, as well as relatively natural zones.
<b>Pesticide consumption</b>	FAO (2023) FAOSTAT: Pesticide Use. < <a href="https://www.fao.org/faostat/en/#data/RP">https://www.fao.org/faostat/en/#data/RP</a> > (accessed 16 January 2023).	Custom data extraction for Australia.
<b>Supply chain resilience</b>	Global Food Security Index (2022) Australia. < <a href="https://impact.economist.com/sustainability/project/food-security-index/explore-countries/australia">https://impact.economist.com/sustainability/project/food-security-index/explore-countries/australia</a> > (accessed 16 January 2023).	A composite indicator that measures the ability to transport crops to market, based off measures off planning and logistics performance, national road infrastructure quality, and air, port and rail infrastructure quality.
<b>Total ecological footprint per person</b>	Global Footprint Network (2023) Australia. < <a href="https://data.footprintnetwork.org/#/countryTrends?cn=10&amp;type=BCpc,EFCpc">https://data.footprintnetwork.org/#/countryTrends?cn=10&amp;type=BCpc,EFCpc</a> > (accessed 16 January 2023).	A measure of how much area of biologically productive land and water a country requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices. Measured in terms of global hectares. This is a biologically productive hectare with world average biological productivity for a given year.
<b>Water footprint of the average Australian diet</b>	Ridoutt, B, Baird, D, Anastasiou, K, and Hendire, G (2019) Diet Quality and Water Scarcity: Evidence from a Large Australian Population Health Survey. <i>Nutrients</i> 11(8).	Dietary data was taken from the ABS 2011–2013 Australian Health Survey and integrated with water-scarcity footprint data across individual food types.

INDICATOR	SOURCE	ADDITIONAL COMMENTARY
<b>Focus Area 5: Increasing value and productivity</b>		
<b>Agricultural infrastructure level</b>	Global Food Security Index (2022) Australia. < <a href="https://impact.economist.com/sustainability/project/food-security-index/explore-countries/australia">https://impact.economist.com/sustainability/project/food-security-index/explore-countries/australia</a> > (accessed 16 January 2023).	An indicator that measures infrastructure levels such as crop storage, irrigation, and access to market data and mobile banking.
<b>Agriculture, forestry, and fishing value added per worker</b>	ABS (2022) Australian Industry < <a href="https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release">https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release</a> > (accessed 6 April 2023).	CSIRO Futures calculation of industry value added divided by employment for agriculture, forestry, and fishing.
<b>Agriculture, forestry, and fishing employment</b>	ABS (2023) Labour Force, Australia, Detailed. < <a href="https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release">https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release</a> > (accessed 6 April 2023).	CSIRO Futures analysis of agriculture, forestry, and fishing employment.
<b>Crop yields</b>	FAO (2022) Crops and livestock products. < <a href="https://www.fao.org/aquastat/en/databases/">https://www.fao.org/aquastat/en/databases/</a> > (accessed 16 January 2023).	Custom data extraction for Australia.
<b>Extent of sustainable land management practices in agricultural sector for long-term productivity</b>	ABARES (2021) The Natural Resource Management and Drought Resilience: Survey of farm practices.	Results come from a 2021 survey of farm practices conducted by ABARES.
<b>Export and import of food and beverage manufacturing products</b>	ABS (2023) International Trade in Goods and Services, Australia. < <a href="https://www.abs.gov.au/statistics/economy/international-trade/international-trade-goods-and-services-australia/latest-release">https://www.abs.gov.au/statistics/economy/international-trade/international-trade-goods-and-services-australia/latest-release</a> > (accessed 6 April 2023).	Data extracted from Australia's merchandise exports and imports for the food product manufacturing and beverage and tobacco product manufacturing.
<b>Food and beverage manufacturing's contribution to total manufacturing value added</b>	ABS (2022) Australian Industry < <a href="https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release">https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release</a> > (accessed 6 April 2023).	CSIRO Futures analysis of data for food product manufacturing and beverage and tobacco product manufacturing.
<b>Food and beverage manufacturing value added per worker</b>	ABS (2022) Australian Industry < <a href="https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release">https://www.abs.gov.au/statistics/industry/industry-overview/australian-industry/latest-release</a> > (accessed 6 April 2023).	CSIRO Futures calculation of industry value added divided by employment for food product manufacturing and beverage and tobacco product manufacturing.
<b>Food and beverage manufacturing employment</b>	ABS (2023) Labour Force, Australia, Detailed. < <a href="https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release">https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release</a> > (accessed 6 April 2023).	CSIRO Futures analysis of total manufacturing employment, total food product manufacturing employment, and beverage and tobacco product manufacturing employment.
<b>Food export as a percentage of merchandise exports</b>	ABS (2023) International Trade in Goods and Services, Australia. < <a href="https://www.abs.gov.au/statistics/economy/international-trade/international-trade-goods-and-services-australia/latest-release">https://www.abs.gov.au/statistics/economy/international-trade/international-trade-goods-and-services-australia/latest-release</a> > (accessed 6 April 2023).	CSIRO Futures analysis of export data for agriculture; aquaculture; fishing, hunting and trapping; food product manufacturing; and beverage and tobacco product manufacturing.
<b>Innovation expenditure in agriculture, forestry, and fishing</b>	ABS (2021) Research and Experimental Development, Businesses, Australia, 2019-20.	CSIRO Futures analysis of business expenditure on R&D in the agriculture, forestry, and fishing sector.