



# Supplementary material: glossary

TERM	DEFINITION
<b>Aboriginal and Torres Strait Islander knowledge systems</b>	Bodies of integrated, holistic, social and ecological knowledge practices and beliefs pertaining to the relationship of living beings, including people, with one another and with their environments. <sup>1</sup> Indigenous knowledge connects Aboriginal and Torres Strait Islanders with Country, cultures, languages and laws.
<b>Aboriginal and Torres Strait Islander land and sea management</b>	Environmental, natural resource, commercial, economic and cultural resource management activities that protect, maintain, heal and enhance healthy and ecologically diverse ecosystems, productive landscapes and other cultural values. <sup>2</sup>
<b>Agribusiness</b>	All organisations or entities that engage in the production, distribution, marketing, or utilisation of food, fiber, forest products, or biofuel, including those that supply water to and collect waste from those organisations. <sup>3</sup>
<b>Agritourism</b>	Agriculture-based experiences and attractions that encourage tourists to visit the source location of produce and food products.
<b>Alternative proteins (or complementary proteins)</b>	Alternatives to traditional animal sourced proteins that are often made from plants and via advanced food-technology. Examples include cultured (lab-grown) meat, insects, and plant-based proteins such as grains, legumes and nuts.
<b>Antimicrobial Resistance (AMR)</b>	Occurs when bacteria and other microbes become resistant to the drugs designed to kill them, generally through misuse or overuse of the drugs. It can be passed between humans via hospital and community transmission. <sup>4</sup>
<b>Australian Dietary Guidelines (ADGs)</b>	Provide advice on healthy eating and wellbeing for Australians, as well as recommend types, amounts and groups of food which have a positive impact on health and wellbeing. <sup>5</sup>
<b>Avoidable waste</b>	Food waste that could be avoided in the first place through improved efficiency and planning to reduce spillages, spoilage and unnecessary disposal. <sup>6</sup>
<b>Bio-circular economy</b>	An economic model which emphasises the use of renewable, natural capital and prioritises minimising waste and replacing non-renewable, fossil-based products currently used. <sup>7</sup>
<b>Biodiversity loss</b>	The loss of variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. This includes variation in genetic, phenotypic, phylogenetic, and functional attributes, as well as changes in abundance and distribution over time and space within and among species, biological communities and ecosystems. <sup>8</sup>
<b>Biogas</b>	A gaseous fuel which is produced by the fermentation of organic matter or other raw materials.
<b>Biomanufacturing</b>	The use of biological systems that have been engineered, or that are used outside their natural context, to produce a product. <sup>9</sup>
<b>Biophysical environment</b>	The living and non-living objects surrounding an organism or population. For example, plants, animals, soils and water.
<b>Burden of disease</b>	Burden of disease measures the impact of diseases and injuries on a population. It combines the years of healthy life lost due to living with ill health (non-fatal burden) with the years of life lost due to dying prematurely (fatal burden). <sup>10</sup>

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<b>Carbon-neutral foods and Climate-neutral foods</b>	<b>Carbon-neutral foods</b> are foods with a carbon footprint of zero (or have achieved net zero through offsetting). <b>Climate-neutral foods</b> are foods which have net zero addition to radiative forcing or contribute to further increases in global temperatures. <sup>11</sup>
<b>Cell-based agriculture</b>	Cell-based meat is produced using animal cell culture technology, where meat is produced from animal cells using a combination of biotechnology, tissue engineering, molecular biology and synthetic processes. <sup>12</sup>
<b>Circular food economy</b>	A system which focuses on regeneration and waste being repurposed as feedstock for another cycle. <sup>13</sup>
<b>Climate-smart agriculture (CSA)</b>	A consolidated method which manages agricultural factors such as livestock, fisheries and forests, while addressing the interrelated challenges posed by climate change and food security. <sup>14</sup>
<b>Cold chain</b>	A series of precisely coordinated events in a temperature-controlled environment to store, manage and transport products.
<b>Controlled cropping</b>	The technology-based approach to food production which primarily grows agriculture in an indoor setting, with protection against the elements.
<b>Environment and Social Governance (ESG)</b>	A framework which represents an organisation's strategy to be socially, environmentally, and sustainably conscious.
<b>Externalities</b>	The cost or benefit generated by an economic activity that accrues to a third party.
<b>Feedstock</b>	Renewable, biological, raw material that can be used directly to fuel something or be converted to another energy product. <sup>15</sup>
<b>Food environments</b>	Food environments are the physical, economic, political and socio-cultural contexts in which people engage with the food system to make their decisions about acquiring, preparing and consuming food. <sup>16</sup>
<b>Food loss and waste (FLW)</b>	Food intended for human consumption, generated across the entire supply and consumption chain, that does not reach the consumer, or reaches the consumer but is thrown away. This includes edible food (the parts of food that can be consumed but are disposed of), and inedible food (the parts of food that are either unable to be consumed or are not consumed because they are considered undesirable). Food waste includes food that is imported into, and disposed of, in Australia, and food that is produced or manufactured for export but does not leave Australia. <sup>17</sup>
<b>Food preservation technology</b>	Science-based knowledge and innovations that prolong the shelf life of food products and prevents their spoilage.
<b>Food structuring and nutrient encapsulation techniques</b>	<b>Food structuring</b> is the spatial organisation of different food components arising from the assembly and interactions of macronutrients (i.e., proteins, lipids, and carbohydrates) at the molecular scale and nano- and microscales. <sup>18</sup> <b>Nutrient encapsulation</b> is a technology for the packaging ingredients or cells with the help of protective membranes (or shells), that can allow compounds to be protected (from heat, light, oxygen), isolated (from other ingredients or surroundings), or slowly released in the form of nano- and micro-structures. <sup>19</sup>
<b>Food swamps and food deserts</b>	<b>Food swamps</b> are regions where the density of unhealthy food outlets is much higher than healthy outlets. <b>Food deserts</b> are regions where consumers have limited access to food retailers and nutritious foods due to physical and economic barriers. <sup>20</sup>
<b>Food systems (or agri-food systems)</b>	Food systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded. <sup>21</sup> This report refers to systems in plural, accounting for all individual food networks and interactions within a given context.

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<b>Foodways</b>	The set of cultural, social, and economic practices surrounding the production and consumption of food.
<b>Full (or true) costing</b>	The market price of a product, in addition to unpaid external costs incurred by their production, use and disposal. For example, costs associated with nature, climate and people.
<b>Global food system</b>	The aggregate of all individual food systems that operate across the globe at different scales.
<b>Greenwashing</b>	The creation or propagation of an unfound or misleading environmentalist image.
<b>Industry 4.0</b>	The rapid integration of new technologies into industrial processes, driven by increasing interconnectivity, smart automation and robotics, analytics, and human-machine interactions. Most commonly refers to modernisation and digitalisation of the industrial manufacturing sector. Also termed the Fourth Industrial Revolution. <sup>22</sup>
<b>Life Cycle Assessment (LCA)</b>	An analysis which assesses the environmental impact with all stages of a product's life, from the beginning to the end. <sup>23</sup>
<b>Natural capital</b>	The assets from nature which provide environmental services, resourceful inputs and other benefits for economic production. This includes land, ecosystems and natural resource stocks. <sup>24</sup>
<b>Nature-based solutions</b>	Sustainable management practices which restore, sustainably manage and protect natural and modified ecosystems, to effectively address societal challenges. <sup>25</sup>
<b>Non-communicable disease (NCD)</b>	A chronic disease that is not transmitted by human contact, but rather is often caused by unhealthy behaviours.
<b>Nationally Determined Contributions (NDCs)</b>	The set of non-binding national pledges outlined and pursued by signatories of the Paris Agreement, to pursue climate change mitigation measures including targets for greenhouse gas emissions reductions.  Australia has committed to reduce greenhouse gas emissions 43% below 2005 levels by 2030 and achieve net zero emissions by 2050. <sup>26</sup>
<b>Pathogen</b>	Any organism or agent (such as a virus or bacterium) that can cause disease to its host.
<b>Planetary boundaries</b>	The threshold of environmental conditions in which humanity can safely thrive, survive and develop for generations to come. <sup>27</sup>
<b>Post-harvest quality assurance</b>	A program which allows farmers to prove their on-farm practices produce food items which meet the Australian food safety standards under the Australian New Zealand Food Standards Code. <sup>28</sup>
<b>Precision agriculture</b>	Seeks to exert more control over a production system by recognising variation and managing different areas of land differently. <sup>29</sup>
<b>Precision fermentation</b>	A process that uses microorganism strains such as bacteria and yeast to produce specific functional ingredients such as proteins for global food supply purposes. <sup>30</sup>
<b>Primary producer</b>	A food business that makes or produces raw materials, such as meat and eggs.
<b>Regenerative farming</b>	A holistic conservation and rehabilitation approach to food production, guided by principles that aim to rejuvenate soil health, improve water cycles, restore landscape function, maintain biological balances, and minimise the use of materials and practices that disturb desired biological relationships. <sup>31</sup>
<b>Resilience</b>	The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure. <sup>32</sup>  This report considers a resilient food system to be one with the dynamic capacity to absorb, adapt, and transform in response to a disruption; towards the goal of reliably providing nutritious, safe, accessible and sustainable food despite disturbances. <sup>33</sup>

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<b>Self-determination</b>	The right to self-determination concerns the right of all people to (1) have choice in determining how lives are governed, (2) participate in decisions that affect their lives, and (3) have control over their lives and future, including economic, social, and cultural development. It has a particular application to Aboriginal and Torres Strait Islander peoples as Australia’s first peoples. It is recognised as an ‘ongoing process of choice’ to ensure Indigenous communities can meet their social, cultural and economic needs.
<b>Supply chain (or value chain)</b>	The sequence of processes, use of inputs and network of stakeholders involved in the process of producing, distributing, and using a product or commodity.
<b>Sustainable Healthy Diets</b>	Dietary patterns that promote all dimensions of individuals’ health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable. <sup>34</sup>
<b>Sustainable Development Goals (SDG)</b>	The stewardship and use of land resources, including soils, water, animals and plants, to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions. <sup>35</sup>
<b>Sustainable land management</b>	The adoption of land-use systems and practices that maintain and enhance the ecological support functions of the land, while reaping the maximum possible social and economic benefits. <sup>36</sup>
<b>Sustainability</b>	As formulated in the 1987 landmark report by the World Commission on Environment and Development, <sup>37</sup> sustainability refers to the ability of the world’s systems to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. Building on this definition, recent conceptualisations by the UN acknowledge that sustainability requires the reconciliation of environmental, social and economic demands: <sup>38</sup> <ul style="list-style-type: none"> <li>• Environmental: concerned with the interaction between human society with natural ecosystems and environments, and the consequences of these actions</li> <li>• Social: concerned with how interest groups make decisions on the use of natural resources, and the effects on the daily lives of the broader population</li> <li>• Economic: concerned with the how environmental costs of industrial activity are internalised, and the depletion of natural capital resources by modern-day production systems.</li> </ul>
<b>Traceability technologies</b>	The ability to track products through all stages of production, processing and distribution (including importation and at retail).
<b>Trade-offs</b>	Negative effects across any dimension that could result from implementing the action.
<b>Transformation</b>	A change in the fundamental attributes of natural and human systems. <sup>39</sup> It considers both the reconfiguration of the system as a whole and changes within system components, including the ways in which they interact and relate to one another. The synthesis of independent dialogues from the 2021 UN Food Systems Summit saw transformation defined as “major, significant, deep, and broad changes beyond piecemeal reforms, incremental change, and narrowly focused projects and programs.” <sup>40</sup>
<b>Unavoidable food waste</b>	Food waste that cannot be avoided (e.g., banana peels), hence must be managed through resource recovery (e.g., composting or anaerobic digestion for use as fertilisers or energy). <sup>41</sup>
<b>Unhealthy food</b>	Foods that are “energy-dense” but “nutrient-poor”, characterised by the lack of nutrients, vitamins and minerals and the high kilojoules, salt, sugar and fat content. <sup>42</sup>
<b>Vector (disease)</b>	An organism that does not cause disease itself, but spreads infections by conveying pathogens from one host to another.
<b>Vertical farming</b>	The practice of growing produce in layers which are vertically stacked, often in a controlled environment.

## References

- 1 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2017) IPBES 5/15/Annex II to decision IPBES-5/1. <<https://www.ipbes.net/events/ipbes-5-pleinary>>
- 2 Commonwealth of Australia (2020) Royal Commission into National Natural Disaster Arrangements. Chapter 18: Indigenous land and fire management. <<https://naturaldisaster.royalcommission.gov.au/system/files/2020-11/Royal%20Commission%20into%20National%20Natural%20Disaster%20Arrangements%20-%20Report%20%20%5Baccessible%5D.pdf>>
- 3 Fleet D (2016) What is Agribusiness? A Visual Description. *Amity Journal of Agribusiness*, 1(1), 1-6.
- 4 CSIRO (n.d.) Minimising Antimicrobial Resistance. <<https://www.csiro.au/en/about/challenges-missions/antimicrobial-resistance>> (accessed 8 May 2023).
- 5 National Health and Medical Research Centre and Department of Health and Aged Care (2013) Australian Dietary Guidelines: Providing the scientific evidence for healthier Australian diets. National Health and Medical Research Council, Canberra. <<http://www.nhmrc.gov.au/guidelines-publications/n55>>
- 6 Mason L et al. (2011) National Food Waste Assessment: Final Report. Prepared for the Department of Climate Change, Energy, the Environment and Water (formerly Department of Sustainability, Environment, Water, Population and Communities) by the Institute for Sustainable Futures, University of Technology Sydney, Sydney. <<https://www.dcceew.gov.au/sites/default/files/documents/food-waste.pdf>>
- 7 The Center for International Forestry Research (CIFOR) and World Agroforestry (ICRAF) (2021) The Circular Bioeconomy: Knowledge Guide. <<https://www.cifor.org/knowledge/publication/7970>>
- 8 IPBES (n.d.) Glossary: Biodiversity. <<https://ipbes.net/glossary/biodiversity>>
- 9 The National Institute for Occupational Safety and Health (n.d.) Biomufacturing and Synthetic Biology. Centres for Disease Control and Prevention. <<https://www.cdc.gov/niosh/topics/advancedmnf/biomnf.html>> (accessed 8 May 2023).
- 10 Australian Institute of Health and Welfare (2022) Australian Burden of Disease Study 2022. December 2022. AIHW, Canberra. <https://doi.org/10.25816/e2v0-gp02>
- 11 Ridoutt B, Baird D, Hendrie G (2021). Diets within environmental limits: The climate impact of current and recommended Australian diets. *Nutrients* 13(4), 1122.
- 12 Food Standards Australia New Zealand (FSANZ) (n.d.) Cell based meat. <<https://www.foodstandards.gov.au/consumer/generalissues/Pages/Cell-based-meat.aspx>> (accessed 8 May 2023).
- 13 Ellen Macarthur Foundation (n.d.) A circular economy for food will help people and nature thrive. <[Food and the circular economy \(ellenmacarthurfoundation.org\)](https://ellenmacarthurfoundation.org/)> (accessed 8 May 2023).
- 14 The World Bank (2021) Climate-Smart Agriculture. <[Climate-Smart Agriculture \(worldbank.org\)](https://www.worldbank.org/)> (accessed 8 May 2023).
- 15 Botella C et al. (2023) Chapter 4 – Feedstocks and challenges to biofuel development. In *Handbook of Biofuels Production* (Eds. R Luque, C Lin, K Wilson, C Du). Woodhead Publishing. <https://doi.org/10.1016/B978-0-323-91193-1.00008-1>.
- 16 European Public Health Alliance (2019) What are ‘food environments’? <<https://epha.org/what-are-food-environments/>> (accessed 8 May 2023).
- 17 Australian Government (2017) National Food Waste Strategy: Halving Australia’s food waste by 2030. Commonwealth of Australia.
- 18 Acevedo-Fani A et al. (2021) Chapter 20 - Aspects of food structure in digestion and bioavailability of LCn-3PUFA-rich lipids. In *Omega-3 Delivery Systems* (Eds. P García-Moreno, C Jacobsen, A Moltke Sørensen, B Yesiltas) 427-448. Academic Press. <https://doi.org/10.1016/B978-0-12-821391-9.00003-X>.
- 19 Đorđević V et al. (2016) Encapsulation Technologies for Food Industry. In *Emerging and Traditional Technologies for Safe, Healthy and Quality Food* (Eds. V Nedović, P Raspor, J Lević, V Tumbas Šaponjac, G Barbosa-Cánovas). Food Engineering Series. Springer, Cham. [https://doi.org/10.1007/978-3-319-24040-4\\_18](https://doi.org/10.1007/978-3-319-24040-4_18).
- 20 Needham C et al. (2022) Beyond food swamps and food deserts: exploring urban Australian food retail environment typologies. *Public Health Nutrition*, 25(5). <https://doi.org/10.1017/S136898002200009X>
- 21 Nguyen H (2018) Sustainable food systems – concept and framework. UN FAO. <<https://www.fao.org/3/ca2079en/CA2079EN.pdf>>
- 22 McKinsey & Company (2022) What are Industry 4.0, the Fourth Industrial Revolution, and 4IR? 17 August 2022. <<https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-are-industry-4-0-the-fourth-industrial-revolution-and-4ir>>
- 23 Muralikrishna I, Manickam V (2017) Chapter Five - Life Cycle Assessment. In *Environmental Management* (Eds. I Muralikrishna, V Manickam) 57-75. Butterworth-Heinemann. <https://doi.org/10.1016/B978-0-12-811989-1.00005-1>.

- 24 OECD Library (n.d.) 14. Natural Capital. <<https://www.oecd-ilibrary.org/sites/55e3f9a8-en/index.html?itemId=/content/component/55e3f9a8-en>> (accessed 8 May 2023).
- 25 International Union for Conservation of Nature and Natural Resources (n.d.) Nature-based Solutions. <<https://www.iucn.org/our-work/nature-based-solutions>> (accessed 8 May 2023).
- 26 Department of Industry, Science, Energy and Resources (2022) Australia's Nationally Determined Contribution Communication 2022. Commonwealth of Australia. <<https://unfccc.int/sites/default/files/NDC/2022-06/Australias%20NDC%20June%202022%20Update%20%283%29.pdf>>
- 27 Rockström J et al. (2009) Planetary boundaries: Exploring the safe operating space for humanity. *Ecology and Society* 14(2). Online <<http://www.ecologyandsociety.org/vol14/iss2/art32/>>
- 28 Department of Primary Industries and Regional Development (2023) Quality assurance schemes for fresh produce. <<https://www.agric.wa.gov.au/food-safety/quality-assurance-schemes-fresh-produce>> (accessed 8 May 2023).
- 29 CSIRO (n.d.) Precision agriculture. <<https://www.csiro.au/en/research/plants/crops/farming-systems/precision-agriculture>> (accessed 8 May 2023).
- 30 CSIRO (2022) Australia's Protein Roadmap <<https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/csiro-futures/agriculture-and-food/australias-protein-roadmap>>
- 31 Cabral L, Rainey E, Glover D (2022) Agroecology, regenerative agriculture, and nature-based solutions: Competing framings of food system sustainability in global policy and funding spaces. *IDS, IPES-Food*.
- 32 IPCC (2019) Annex I: Glossary [Ed. N Weyer] In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [Eds. H-O Pörtner, D Roberts, V Masson-Delmotte, P Zhai, M Tignor, E Poloczanska, K Mintenbeck, A Alegria, M Nicolai, A Okem, J Petzold, B Rama, N Weyer]. In Press.
- 33 This definition was informed by several stakeholder interviews and existing definitions in literature, including: Béné C et al. (2016) Is resilience a useful concept in the context of food security and nutrition programmes? Some conceptual and practical considerations. *Food Security*, 8. <https://doi.org/10.1007/s12571-015-0526-x>; Carey et al. (2016) Melbourne's food future: Planning a resilient city foodbowl. Victorian Eco-Innovation Lab, The University of Melbourne; Seekell et al. (2017) Resilience in the global food system, *Environmental Research Letters* 12(2); Tendall D et al. (2015) Food system resilience: Defining the concept. *Global Food Security*, 6. <https://doi.org/10.1016/j.gfs.2015.08.001>
- 34 FAO and WHO (2019) Sustainable healthy diets – Guiding principles. Rome.
- 35 IPCC (2019) Annex I: Glossary [Ed. N Weyer] In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [Eds. H-O Pörtner, D Roberts, V Masson-Delmotte, P Zhai, M Tignor, E Poloczanska, K Mintenbeck, A Alegria, M Nicolai, A Okem, J Petzold, B Rama, N Weyer]. In Press.
- 36 FAO (n.d.) Sustainable Land Management. Food and Agriculture Organization of the United Nations, Land & Water. <<https://www.fao.org/land-water/land/sustainable-land-management/en/>> (accessed 8 May 2023).
- 37 WCED (1987) Report of the World Commission on Environment and Development: Our Common Future. <<http://www.un-documents.net/our-common-future.pdf>>
- 38 Thomsen C (2013) Sustainability (World Commission on Environment and Development Definition). In *Encyclopedia of Corporate Social Responsibility* (Eds. S Idowu, N Capaldi, L Zu, A Gupta). Springer, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-642-28036-8\\_531](https://doi.org/10.1007/978-3-642-28036-8_531)
- 39 IPCC (2019) Annex I: Glossary [Ed. N Weyer] In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [Eds. H-O Pörtner, D Roberts, V Masson-Delmotte, P Zhai, M Tignor, E Poloczanska, K Mintenbeck, A Alegria, M Nicolai, A Okem, J Petzold, B Rama, N Weyer]. In Press.
- 40 UN (2021) Synthesis of Independent Dialogues: Report 3. Food Systems Summit 2021 Dialogues. September 2021. <[https://www.un.org/sites/un2.un.org/files/2021/09/unfss\\_independent\\_dialogue\\_synthesis\\_report\\_3\\_0.pdf](https://www.un.org/sites/un2.un.org/files/2021/09/unfss_independent_dialogue_synthesis_report_3_0.pdf)>
- 41 Mason L et al. (2011) National Food Waste Assessment: Final Report. Prepared for the Department of Climate Change, Energy, the Environment and Water (formerly Department of Sustainability, Environment, Water, Population and Communities) by the Institute for Sustainable Futures, University of Technology Sydney, Sydney. <<https://www.dcceew.gov.au/sites/default/files/documents/food-waste.pdf>>
- 42 National Health and Medical Research Centre and Department of Health and Aged Care (n.d.) Discretionary food and drink choices. National Health and Medical Research Council, Canberra. <<https://www.eatforhealth.gov.au/food-essentials/discretionary-food-and-drink-choices>> (accessed 8 May 2023).