



LAND USE  
FUTURES

# GLOBAL FOOD AND LAND USE TRANSITIONS



## Reducing food loss and waste

GLOBAL FOOD AND LAND USE TRANSITIONS

Around one third of all food is lost or wasted globally<sup>1</sup>, with direct economic losses estimated at around USD \$1.25 trillion<sup>2</sup>. Food loss and waste accounts for eight per cent of global emissions and a quarter of all water use by agriculture. An area of land the size of China is used to produce food that is ultimately wasted<sup>3</sup>.

Food waste occurs throughout the value chain in production, handling and storage, processing and packaging, distribution, retail, and with the end consumer (households and businesses). Reducing food loss and waste is critical because it reduces pressure on the climate, water and land resources<sup>4</sup> while offering<sup>5</sup>:

- Improved food security via the redistribution of excess edible food.
- Reduction in costs to businesses (via saved resource inputs, lower waste disposal fees, increased profits due to improvements in efficiency).
- Increasing business profits by converting saved waste ingredients into a product for sale.
- Economic opportunities via creation of new products, services and markets.
- Reduced costs to households by saving on grocery bills.

Key steps to reducing food loss and waste are<sup>6</sup>:

- Reducing food waste through improvements in efficiency and optimisation across the supply chain.
- Redistributing surplus food within the food system.
- Repurposing unavoidable food waste into new products (see the [Building Local Loops and Linkages paper](#) for more detail about waste reuse within local food economies).



## AUSTRALIAN CONTEXT

**Around 40 per cent of all food produced in Australia is wasted<sup>7</sup>, with substantial environmental and economic implications**

- Over seven million tonnes of food (40 per cent) is wasted annually in Australia, equivalent to 298kg per person<sup>8</sup>.
- Food waste is estimated to cost the Australian economy approximately \$20 billion per year<sup>9</sup>, including an estimated \$2.8 billion cost to farmers, and \$2,200-\$3,800 annual cost per household<sup>10</sup>.
- Food waste has environmental costs in production and disposal, from unnecessary water use, land use and emissions<sup>11</sup>.

.....

**Food waste in Australia occurs throughout the value chain**

- **HOUSEHOLDS:**  
Around one third of food waste occurs in households<sup>12</sup>, a result of over-purchasing of food, confusion over 'use-by' and 'best-before' dates, poor knowledge about storing food and repurposing leftovers, and limited access to food waste collection systems<sup>13</sup>.
- **PRIMARY PRODUCTION:**  
Around one third occurs in primary production<sup>14</sup>, a result of pests, disease and weather impacts, damaged stock from picking or handling, falls in market prices and labour shortages making it unprofitable to harvest, inability to deliver products to contracted size or quality and changes in consumer preferences<sup>15</sup>.
- **MANUFACTURING AND PROCESSING:**  
Another quarter occurs in manufacturing and processing<sup>16</sup>, resulting from spoilage due to poor temperature control, damage to food or packaging due to handling, equipment failure, changes in consumer preferences, spillage, inefficient inventory management, and 'excessive trimming' of vegetables for processing<sup>17</sup>.
- **FOOD RETAIL AND SERVICES:**  
While a comparatively small amount of food waste occurs at the food retail and service level (four and three per cent, respectively), these value chain players have the ability to influence food waste throughout the food value chain, through product and packaging specifications and design, cosmetic standards, product dates, provision of clear food preparation and storage guidance, and quality standards<sup>18</sup>.





## CURRENT STATE OF PLAY

Key action areas<sup>i</sup> for reducing food loss and waste include:

- **DEVELOP AMBITIOUS NATIONAL STRATEGIES** that cover the entire food value chain and involve farmers, food processors, retailers, consumers, and non-profit organisations.
- **ENGAGE LARGER COMPANIES TO SET TARGETS AND REPORT ON FOOD LOSS AND WASTE**, especially for hospitality, catering, food processing, farming and grocery retailing. Companies can lead the way by building the systems to collect accurate data and improving transparency about their performance.
- **INTRODUCE POLICIES, REGULATIONS AND INCENTIVES** for food waste and loss reduction, including clarifying food safety liabilities of supermarkets, restaurants and other food producers when donating leftover food to charities.
- **STEP UP BUSINESS INNOVATION** to support food waste reduction (e.g. food recovery apps) and development of new food products using food waste.
- **SCALE PRIVATE AND PHILANTHROPIC INVESTMENT.**
- **SHIFT PUBLIC ATTITUDES TOWARDS SEEING FOOD WASTE AS UNACCEPTABLE.**

The table below outlines the current state-of-play for each action area, including major current and proposed initiatives.

KEY ACTION AREA	PROGRESS TO DATE
DEVELOP AMBITIOUS NATIONAL STRATEGIES	<ul style="list-style-type: none"> <li>● National Food Waste Strategy launched in 2017 and aims to halve food waste by 2030 (in line with UN Sustainable Development Goals), with \$1.4 million in supporting funding. Resulted in the National Food Waste Baseline and National Food Waste Roadmap, whose delivery will commence in 2020 including implementation of sector action plans.</li> <li>● States and territories are primarily responsible for managing waste, and all states and territories have introduced or are in the process of updating waste and circular economy plans and policies, most of which have specific food plans or actions<sup>19</sup>.</li> </ul>
ENGAGE LARGER COMPANIES TO SET TARGETS AND REPORT ON FOOD LOSS AND WASTE	<ul style="list-style-type: none"> <li>● A number of food retail and service companies have introduced targets and initiatives targeting food waste, for example Woolworths' Zero Food Waste 2020 program; Coles' commitment to divert 90 per cent of waste from landfill by 2022, and halve food waste by 2020; Compass' Stop Food Waste campaign.</li> <li>● Few companies have food waste reporting frameworks in place, and data collected is highly variable<sup>20</sup>.</li> <li>● National Food Waste Strategy includes a voluntary commitment program to reduce food waste, under development by FIAL and due to launch in 2020<sup>21</sup>.</li> </ul>

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<sup>i</sup> Based on the Growing Better report.

KEY ACTION AREA	PROGRESS TO DATE
<p>INTRODUCE POLICIES, REGULATIONS AND INCENTIVES</p>	<ul style="list-style-type: none"> <li>● A range of policies have been proposed, including tax exemptions for food recovery and repurposing<sup>22</sup>, mandating of unsold food to standardise the practice<sup>23</sup>, mandatory targets for the recycling of food and avoidance of waste to landfill<sup>24</sup> and incentives for household worm farms and compost bins<sup>25</sup>.</li> <li>● Most states and territories impose a levy on waste which incentivises waste reduction and funds waste minimisation activities<sup>26</sup>, and it has been proposed that these could be complemented by bans or limits on organics in landfill<sup>27</sup>.</li> <li>● The National Food Waste Strategy will investigate areas where legislation, incentives or other policies could better support food waste reduction and repurposing<sup>28</sup>.</li> </ul>
<p>STEP UP BUSINESS INNOVATION</p>	<ul style="list-style-type: none"> <li>● <b>HOUSEHOLD:</b> Mealbox delivery services can eliminate waste by providing precise meal portions as well as other environmental benefits, although packaging is an issue<sup>29</sup>. Other key innovations include kerbside organic waste recovery by local councils, although concerns exist about impending shortfall in processing facilities<sup>30</sup>, recovery of organic waste from sewage plants and use for energy production<sup>31</sup>.</li> <li>● <b>PRIMARY PRODUCTION:</b> Key innovations focused around repurposing of pre-farmgate produce that doesn't meet retailers' standards, e.g. development of a potato starch industry for prebiotics, packaging, bioplastics, and turning 'seconds' bananas into gluten free banana flour.</li> <li>● <b>MANUFACTURING AND PROCESSING:</b> Key innovations focus on waste recovery and repurposing e.g. use of sugar milling by-products for biofuels and animal feed, as well as techniques to increase shelf life.</li> <li>● <b>RETAIL AND SERVICE:</b> Companies have implemented a range of strategies to reduce in-store waste (e.g. donation to hunger relief charities, repurposing of food waste into new products, improving packaging and reducing single use plastics, food waste dehydration technology to dramatically reduce waste volume), often working with digitally-enabled third party providers such as Yume<sup>32</sup>. Despite some 'ugly food' initiatives, concerns remain about the impact of retailers' strict size and appearance requirements for fresh produce in creating pre-farmgate waste<sup>33</sup>.  .....</li> <li>● <b>Food recovery</b> is a rapidly growing innovation area with digital solutions emerging e.g. Yume has created a platform to connect suppliers of food that could've been wasted, with buyers<sup>34</sup>.</li> <li>● <b>Food waste repurposing</b> is another major innovation area offering solutions throughout the value chain, e.g. Goterra offers modular units that can be installed on-site and use food waste to produce insect protein<sup>35</sup>.</li> <li>● The role of <b>packaging</b> is a significant area for innovation in avoiding plastic or other waste, including that made from sustainable materials (e.g. 'Go Green World' packaging is made from sugarcane, card, paper and pine) and/or compostable or soluble (e.g. BioPak and Aquapack)<sup>36</sup>.</li> <li>● The <b>Fight Food Waste CRC</b> was established in 2018 with \$33 million in cash and \$57 million in-kind contributions and will support the National Food Waste Strategy by working to identify priority projects for next three years.</li> </ul>

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KEY ACTION AREA	PROGRESS TO DATE
SCALE PRIVATE AND PHILANTHROPIC INVESTMENT	<ul style="list-style-type: none"> <li>● The National Food Waste Strategy will commission a study to “identify where opportunities exist to target actions for investment in Australia [which] ... may include capturing fruits or vegetables that may not meet market specifications for conversion into higher value-added products, or capturing food waste from the hospitality sector for conversion into soil improvement products”<sup>37</sup>.</li> </ul>
SHIFT PUBLIC ATTITUDES	<ul style="list-style-type: none"> <li>● 2017 War on Waste documentary series helped mainstream the food waste issue and catalysed business to introduce new initiatives<sup>38</sup>.</li> <li>● States and territories run programs to raise awareness of the need to reduce food waste, and to help people, businesses and schools take action e.g. Love Food Hate Waste<sup>39</sup>.</li> <li>● The FoodWise website provides information about food waste and how to reduce it in the home<sup>40</sup>.</li> </ul>



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## FOR MORE INFORMATION

The Land Use Futures program is working to adapt the global transitions to reflect Australia's unique national and regional circumstances, and identify key actions to accelerate the transition. This paper is the first step in that process.

Find out more about Land Use Futures by visiting our website: [www.climateworksaustralia.org/project/land-use-futures](http://www.climateworksaustralia.org/project/land-use-futures)

The Land Use Futures program is led by ClimateWorks Australia (working within the Monash Sustainable Development Institute), Deakin University and CSIRO.

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